THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

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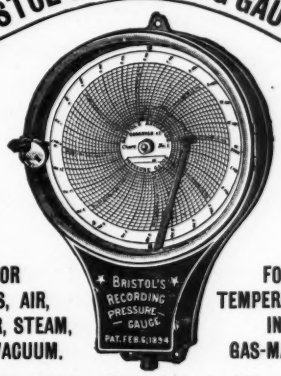

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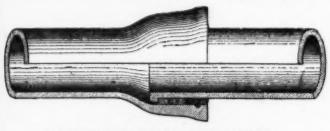

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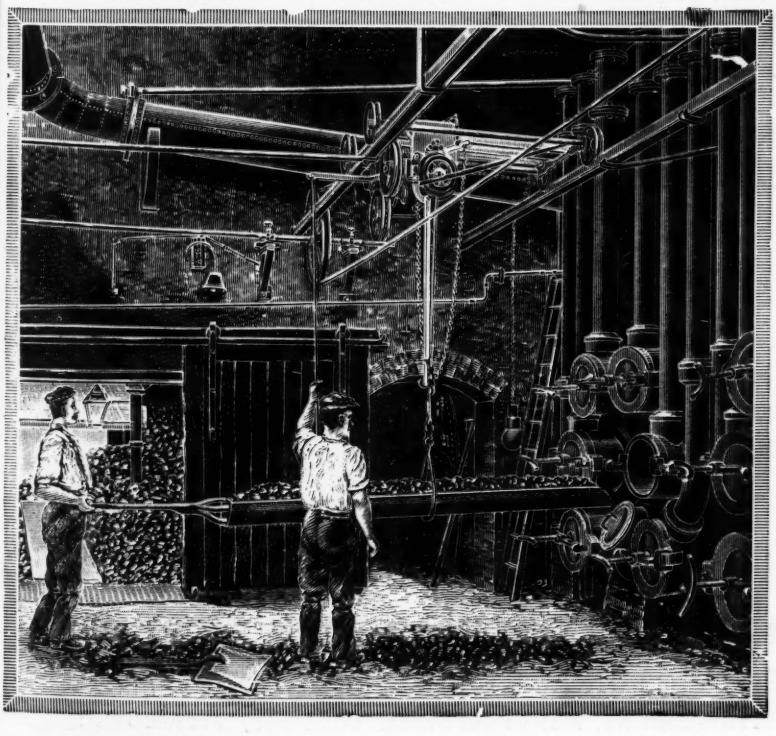

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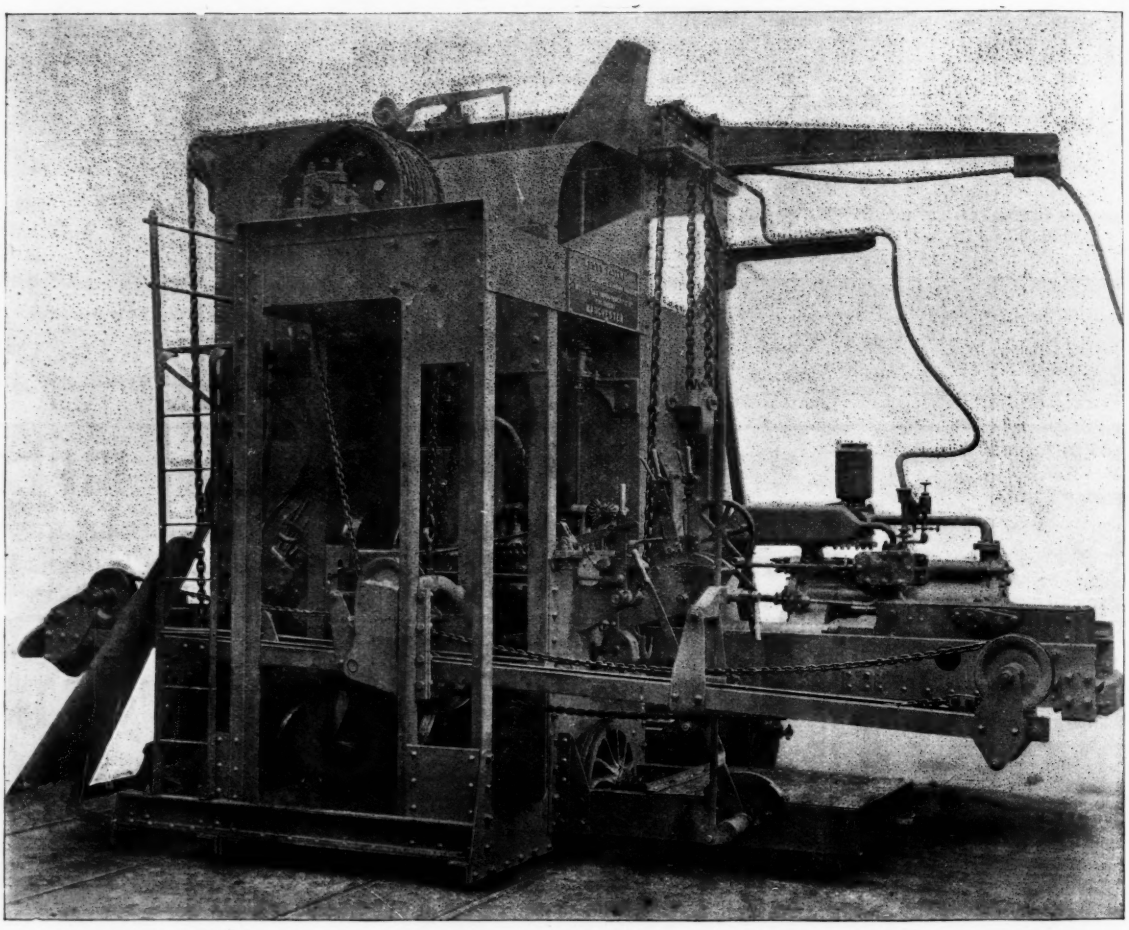

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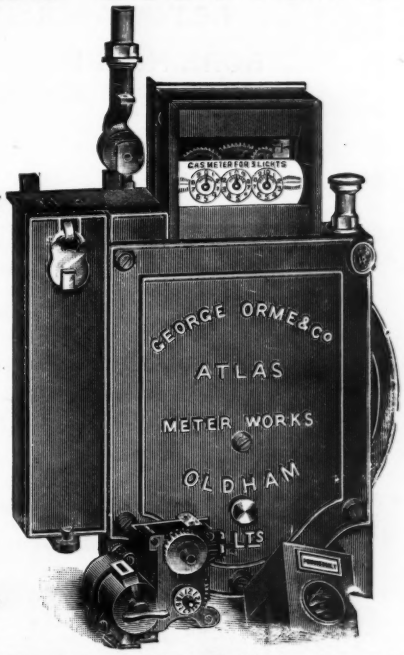

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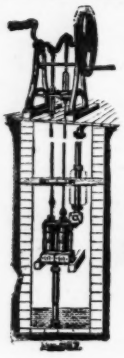

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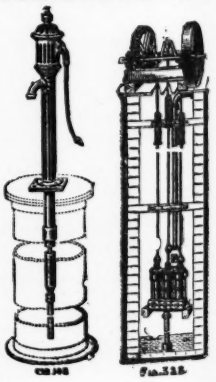

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Berlin V. (Schmargendorf)	20	180	Mannheim	6	54
Berlin, I. C. G. A.	46	414	Mainz (Maintz)	7	63
Bielefeld	8	72	Muelhausen i. Els.	10	90
Bockenheim, near Frankfort	29	261	Muehlhausen i. Th.	4	36
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Cassel	17	153	Pest Mineralölfabrik	1	3
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Chemnitz	19	171	Odense	9	72
Coblenz	13	117	Randers	4	36
Darmstadt	12	108	Remscheid	3	27
Danzig	10	90	Rostock	6	54
Dresden II.	14	126	Rixdorf	12	108
Dresden III.	10	90	Stettin	21	189
Drontheim	2	18	Stockholm	24	216
Esslingen	3	27	Strandvej	4	36
Elberfeld	5	45	Trieste	18	162
Frederiksberg	27	233	Winterthur	8	72
Flensburg	6	54	Witten	4	36
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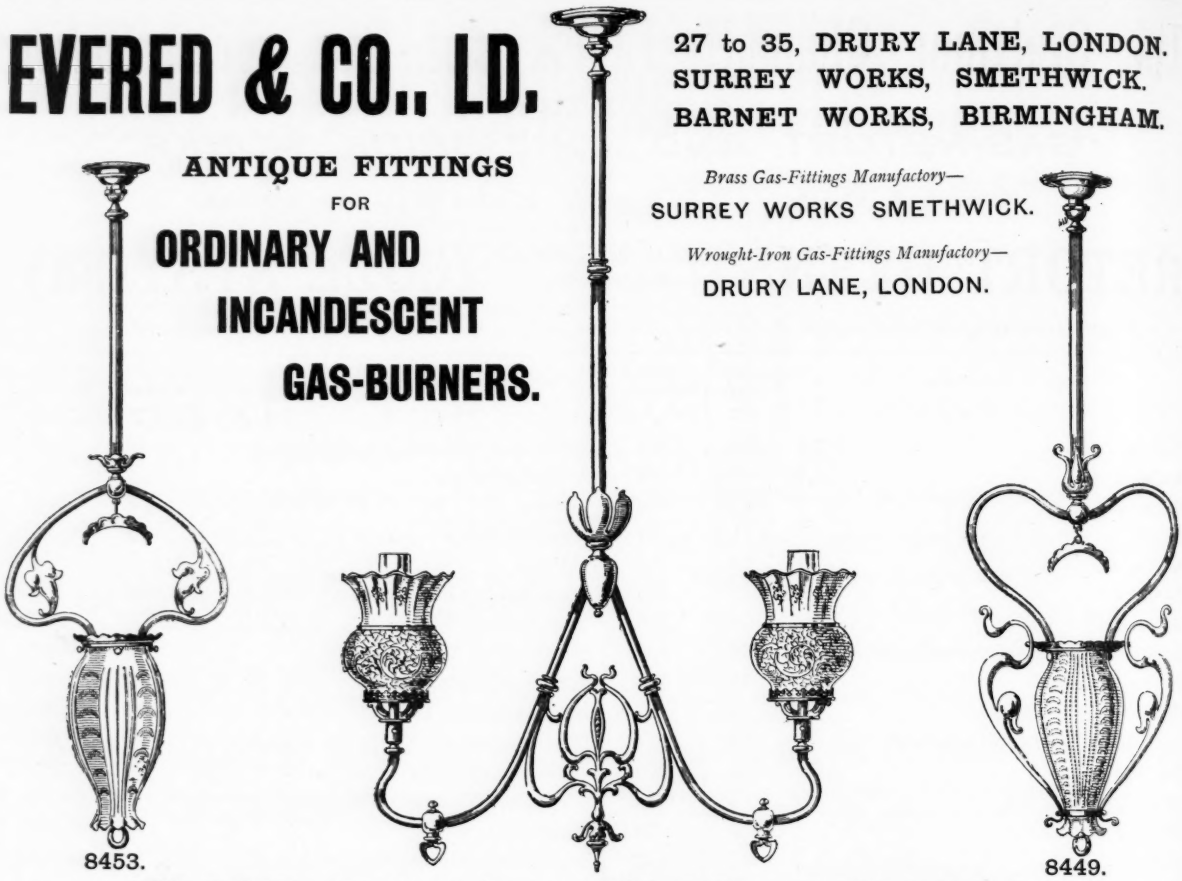

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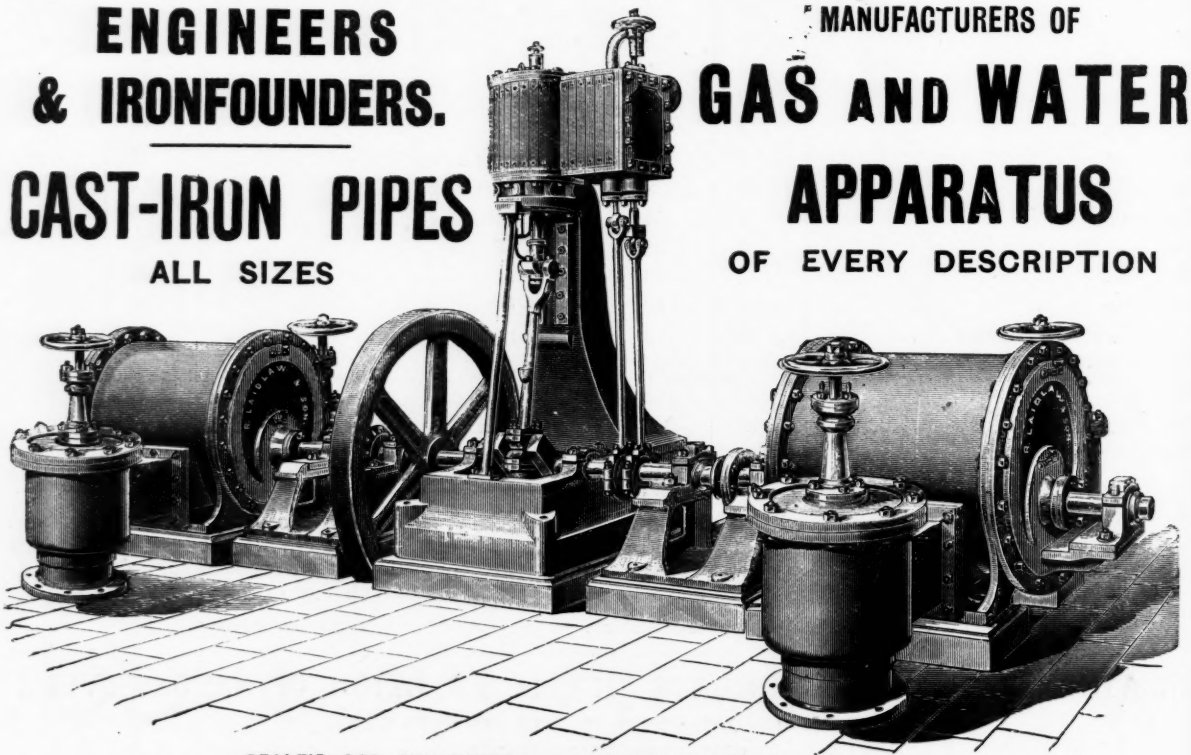

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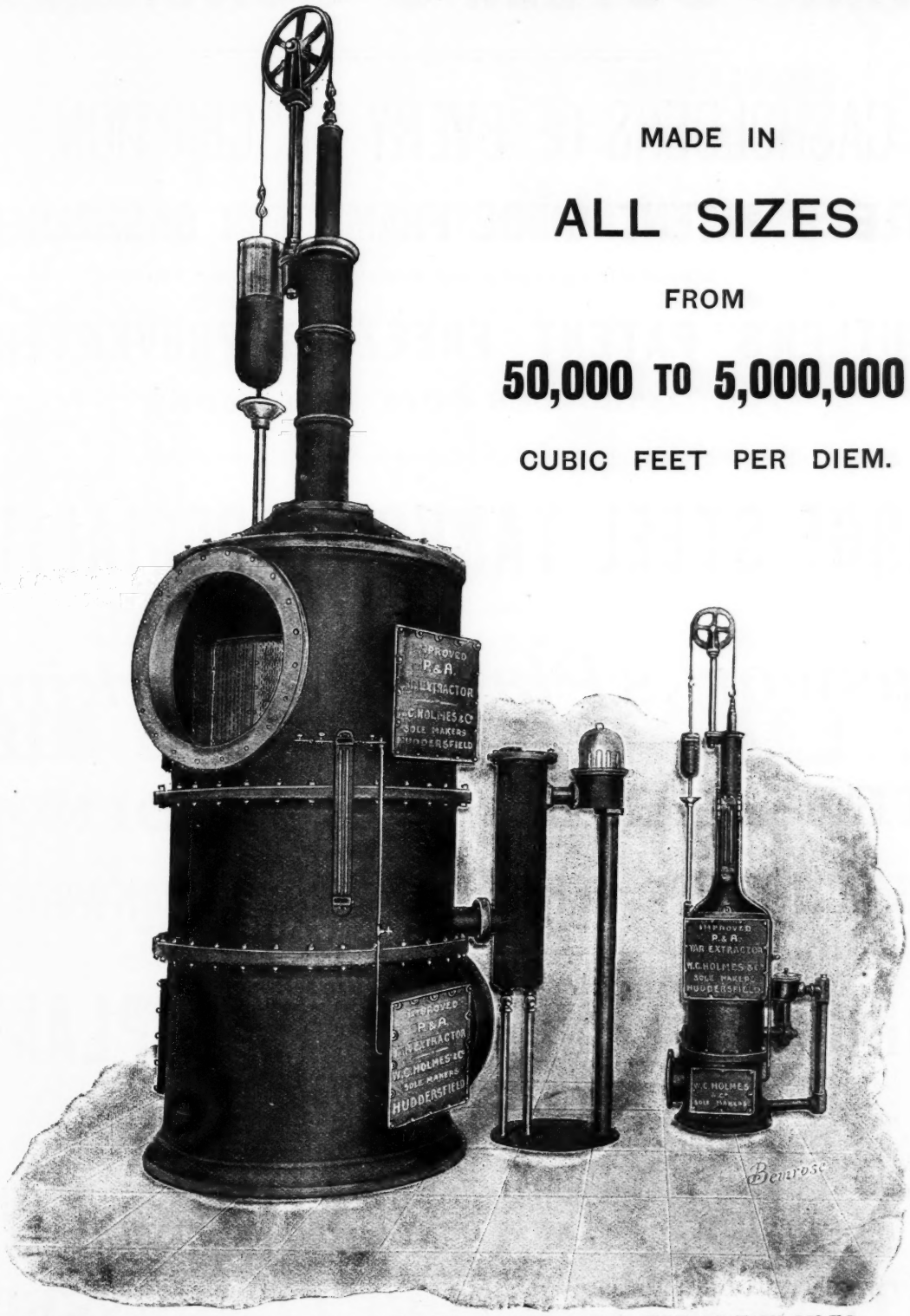

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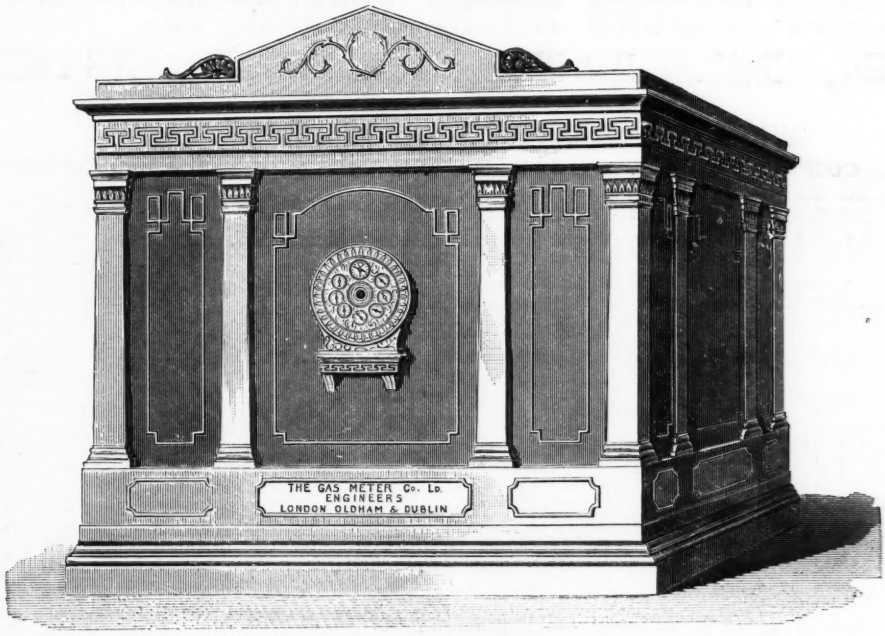

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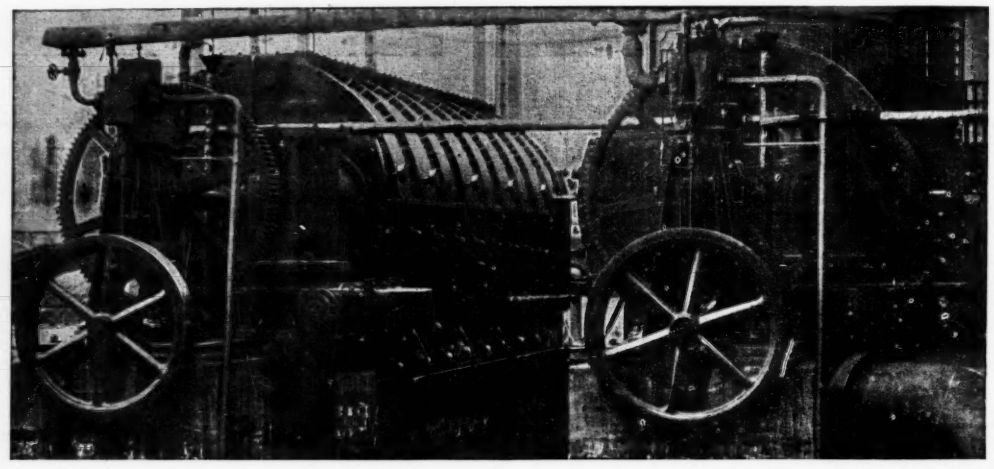

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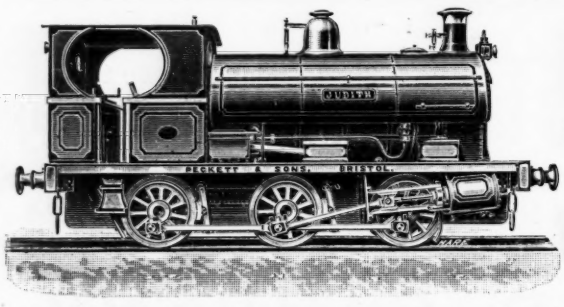

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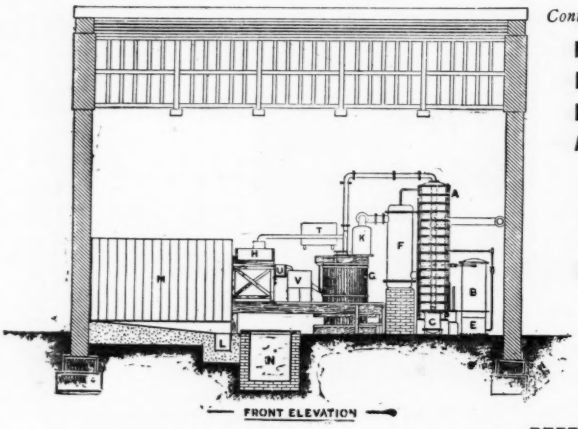

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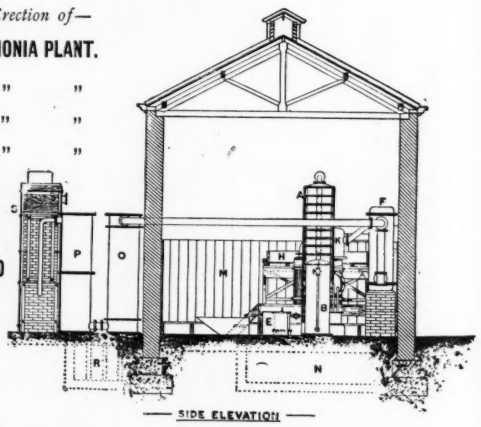

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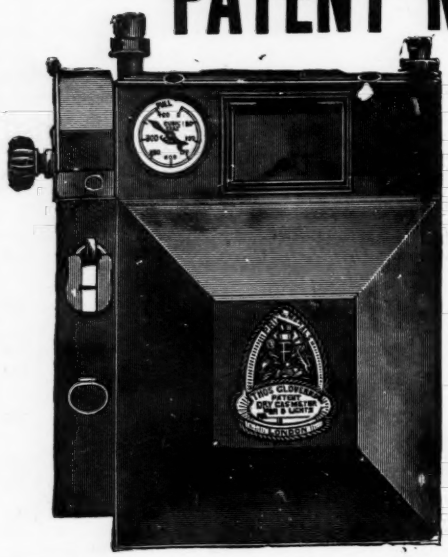

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VOL. LXXXI., No. 2074.—TUESDAY, FEBRUARY 10, 1903.

EDITORIAL NOTES.

The Meeting of the Gaslight and Coke Company. A Stormy Scene.

THE meeting of the Gaslight and Coke Company on Friday was of a very remarkable character. It lasted two hours, during every minute of which somebody was speaking, and sometimes two or three were doing so at once. Practically, the business of the ordinary and of the Wharncliffe meeting was consolidated; and the proceedings resolved themselves into a long and well-sustained attack upon, and defence of, the Administration. The Governor—Sir W. T. Makins, Bart.—moved the adoption of the report and accounts in a speech which would have been applauded as clever and interesting under ordinary conditions. As a matter of fact, it was both; but it suffered from the circumstance that the audience were not thinking much about the various matters of detail over which the Governor glided with his habitual skill. The truth is—and it appears to have taken possession of the minds of many business men of late years—that the world has grown tired of the race of adept chairmen of company meetings, who, if they could not always make a good showing for the property, might be depended upon to manage a general meeting excellently well. The public nowadays demand efficiency, not so much in the chair, as at the head of affairs; and therefore the experienced Chairman at the Horseferry Road was not quite so happy on Friday as heretofore.

It was a pity, too; for the Governor had much to say that was worth listening to concerning the proper use of gas-stoves, the success of the incandescent burner maintenance system of the Company, the pressure of the rising rates of London, and the latest manifestations of municipal trading. We can refer readers to the report of the speech, in the fullest confidence that it will be found full of material for the use of chairmen of prosperous gas companies all over the kingdom. Unfortunately for Sir William Makins, it was soon to appear that the somewhat crowded assembly had not come to hear about the way to use gas-stoves, but to "heckle" the directorate. A very lively hour-and-a-half was spent in this exercise. After it was over, the Governor and Deputy-Governor, as representing the Old Guard of the Horseferry Road, had felt their seats shaking under them; while Mr. Corbet Woodall, who was understood to represent the "new blood" of the Board, was re-elected by acclamation, and without a dissentient voice. Surely, these be portents.

There was such a galaxy of critical talent present at the Horseferry Road and in lively action on this occasion, that it would be difficult to rank the various performers. Sir George Livesey, as is his wont when he cares to do so, put his finger upon the main grievances of the proprietary, which he enumerated as follows: Loss of dividend; fall in the value of the investment; and decrease of business. He also declared that the state of the proprietors of ordinary stock is one of present anxiety, and of uncertainty as to the future. His remarks must be read *in extenso* as we give them; for they were already as severely condensed as the nature of the argument permitted. Then followed an exceedingly bitter cry from a prominent Bath stockbroker, who complained of the depreciation in the value of the Company's ordinary stock. Thereafter, complainants sprang up in all parts of the hall, one of whom, as a representative of Parliament, had an attentive hearing while he told what members of the Legislature and Londoners generally think of the Company. It was all really very dismal to hear; and not the least bitter reflection was it to think how the enemies of the gas industry must rejoice over it. And it was all so gratuitous, and the remedy is so hard to find! Our foes will persist in saying that, because the largest gas undertaking in England is in the bad circumstances disclosed at the meeting, therefore the gas industry as a whole is failing. The reproach is a fair one on the face of the matter; and they can scarcely hope to be believed who maintain that the Horseferry Road is not a proper criterion for the whole of the national industry to which it belongs. If the biggest Gas Company is not also the best, then the gas company as an institution must be a failure. The argument is not an unnatural one in the circumstances.

Such an occurrence as the revolt of a substantial minority of the shareholders present in general meeting, including men of considerable substance, against the re-election of the Governor, is probably without precedent in the history of the Gaslight and Coke Company. It is an event that calls for some serious reflections upon the position. Though the order of the business taken on Friday was rather irregular, this was unavoidable, in view of the fact that the Bill drafted by the Directors for the year must be regarded as the last fruit of their united wisdom. If it should be thrown out, like its nearest predecessors, how can the old Board meet the shareholders again? It is idle to sigh for 1900, when even the present mood of the Board might have prevailed with Parliament. That opportunity was lost; and every subsequent year has but increased the interest chargeable on the loss. One point at least was gained by the proprietors last Friday—the right to be supplied by the Company with an adequate report of the proceedings of the general meeting. This was resisted on the part of the Board for years; but was yielded at last with a good grace.

Qualifications of Directors.

THE soul of Lord Claud Hamilton, Chairman of the Great Eastern Railway Company, has been stirred to wrath by the remark made by the Minister for Agriculture the other day, that the Railway Companies have too many "ornamental" directors upon their Boards, and not enough men of practical knowledge and commercial experience. Mr. Hanbury was speaking to a meeting of farmers, and was dealing with the ever-burning question of railway rates in connection with agriculture; hence, doubtless his restriction of the criticism to Railway Companies. But it is by no means only to those undertakings that the remark applies. The bulk of the large industrial companies of this country are—as we have before often pointed out—suffering from the same weakness in the *personnel* of their directorates. Lord Claud, in an interview published in the "St. James's Gazette," is reported as declaring his belief that "the day of the ornamental director "is passed." If by that he means that the day has passed when such gentlemen should be given, or permitted to retain, seats on the Boards of the great companies, we cordially agree; but if, on the other hand, Lord Claud means that, in his opinion, none of the directors of those companies can now be classified as "ornamental," we can only say that he is thereby denying to not a few persons the only complimentary adjective that can truthfully be applied to them as directors.

"Men are elected to the Boards of Directors for various "reasons," says Lord Claud, and those who know anything about these matters will most certainly assent to the statement; adding, however, that some of these "various "reasons" would—if explained in a Palace of Truth—scarcely impress the public with their sufficiency or relevancy. Judging by results, one would say that the one qualification which is most highly esteemed by those who have the selection of candidates for directorships is complete ignorance on the part of the candidate of the particular business which he is to be chosen to direct. He is then, naturally, less likely to disturb ancient traditions and introduce modern methods into sleepy concerns, than a director would be who happened to know—what shall we say?—a retort-house from a purifier. But it would not strike the common man as making for the highest efficiency in any industry that the directors of companies should be chosen upon almost any ground rather than that of intimacy with the business concerned; yet apparently such a system commends itself to Lord Claud Hamilton as the best. For he explained to the interviewer (according to the report before

us) that he prefers the present system to one of choosing Directors for their special knowledge. "Some people," he is reported to have said, "hold that the Chairman of a "Railway Company should be an expert. I do not agree "with that. The General Managers of our large railways "are among the most capable men you can get anywhere; "and *it is they who suggest the policy to be followed by the Com-"panies*. If your Chairmen are to be experts, you would "have no need for General Managers, and then would arise "the danger of one man having too much power. No; I "think our present system is to be preferred." How Lord Claud could, in the next breath, speak of the day of ornamental directors being passed, is beyond comprehension; for, if the sentence we have italicized in particular, and the whole paragraph generally, means what it says, the Directors of the Railway Companies of this country are declared by the Chairman of one of them to be simply puppets in the hands of the General Managers! Indeed, later on, Lord Claud explains that the Directors are really little more than glorified canvassers on behalf of their Companies: "One "man is chosen because he has influence in bringing traffic; "another because of his financial ability; and all of them in "the interests of the respective Companies."

This really opens up, in a very plain fashion, the question, What are, or what should be, the functions of a Board of Directors? Are Directors to be appointed by the shareholders merely to enter on the minute-books resolutions embodying policy dictated by an expert General Manager—how, by the way, is the inexpert Director to judge of the comparative expertness of the Manager in whom he so implicitly trusts?—to sign such cheques as an expert General Manager puts before them, and use their influence as large shareholders in favour of the greatest possible distribution of profits, rather than in favour of conservation of reserves and development of business? Or are Boards of Directors to be the modern substitute for the "partners" of the smaller firms which were the rule and not the exception in bygone days, who were all "expert" men, taking an active and intelligent part in the "directing" of the business, and needing no General Manager to guide them? Surely there can be no question of which is the more desirable system, any more than there can be any question as to which system most generally prevails. We have heard, in recent times, of a big company in which two of its principal "expert" Managers differed over a matter of some importance in the technical working of the business—and the Directors were quite incapable of deciding between them! Indeed, so far as we know, the "expert" subordinates are still disputing the point before a Board of Directors chosen, as Lord Claud Hamilton would say, "for various reasons." Are inexpert—albeit honest and well-meaning, but none the less commercially incompetent—Directors really to be preferred to men who know their business, just because they have been through it and come out on the top—say, to Sir Christopher Furness, Sir William Thomas Lewis, or Sir George Livesey? Why, we ask—as we have asked before, and never received any reply in the negative—why should not specially competent officers of any company be put on the Board, while still retaining the offices which give them detailed and intimate knowledge of the position and needs of the business? The Directors would then be persons able to direct—which would be a distinct reform.

The Cost of Municipal Trading.

In another column will be found a report of the discussion at the Society of Arts of Mr. Davies's paper on "The Cost "of Municipal Trading." Lord Alverstone, the Lord Chief Justice of England, presided at both the meetings devoted to the reading and discussion of this paper; and he has been rewarded for his pains with a dose of that scurrility which seems to be cultivated as a branch of Progressive politics. It has pleased the conductors of certain newspapers to profess to believe that Lord Alverstone has allowed himself to be "captured" by certain foes of the municipal idea, who always turn out at last to be persons in the pay of the British Electric Traction Company. It must be a curious order of mind that cannot find its way through the maze of the world's affairs, unless lighted by some real or imaginary glimmer of interested motives. Progress can hardly be very rapid under such conditions. At the same time, we have no hesitation in saying that the cause of individual enterprise in the national industries would flourish just as well without the incessant ostentatious patronage of the Morses, and Garckes, and other pluralist cultivators of the electricity supply and tramway company interest. The antagonism to inflated Municipalism does not need the assiduous cultivation of the officials of electrical companies numerous enough, one would imagine, to keep them adequately employed in their own offices. The wearisome performances of the Donington House brass band only cause the municipalist to scoff, and make the judicious grieve. Whatever the baser sort of Progressive, who is of opinion that every public man has a price which is not beyond the reach of the British Electric Traction Company, may care to impute to Lord Chief Justices and others by way of motive, it is the fact that there is a large and rapidly growing number of people who have no faith in municipal trading, and are certainly not paid by Messrs. Morse, Garcke, and Co., for saying as much. They would far rather these pushing persons kept themselves and their affairs out of the question. If municipal trading should ever be checked, it will not be for their sake. We are increasingly of opinion that the test of the idea will eventually be found, not in profit or loss, but in the political complication resulting from the employment by local authorities of one contingent of voters and the housing of another. The British public will not for long suffer the anomaly that while a shareholder of a local gas company, being a member of a town council, must not take part in the settlement of a question of public lighting, thousands of men employed and housed by the same local authority can make and unmake the membership of the body. If this is right, reasonable, and constitutional, then the man who expressed the opinion that this is a "mad world" was speaking far below the mark.

Mr. Asquith on the Law of Trade Combinations.

The present state of the law relating to Trade Unions and combinations for the collective organization of labour and employment on both sides, is so uncertain, that particular interest attaches to everything that may be said on the subject by eminent lawyers. For this reason, careful attention is due to the speech of Mr. Asquith at the "Eighty "Club" dinner on Friday, inasmuch as it was wholly devoted to the single topic of "the state of the law in reference to "trade combinations;" and the subject was treated with a degree of legal acumen, elevated by the sense of statesmanship, which was particularly grateful. Mr. Asquith started from the common ground, which is not in dispute, that the change in the law in the recognition of the right of free combination has been wise and beneficent in the interest of the employers, the workmen, and the community at large. He went on to say that whatever drawbacks there might be in the working of these combinations, whether of employers or of workmen, they are incidental to the abuse and not the use of the right of combination. This is the conclusion for which we have been arguing here for many years, and which is only now being enforced upon those who are most nearly concerned in the operation of Trade Unions by the strong, if slow-moving, arm of the law. It has taken all these years to bring home to the incurious mind of the public, and to the prejudiced and narrow mind of the professional Trade Unionist, that the much-vaunted right of combination does not carry with it any licence to perpetrate wrongs. That wrongs have been done, and that men have died of and been ruined thereby, no witness of the course taken by trade combinations in this country can have avoided seeing. That poor shoemaker of Leicester would not be victimized to-day as he was in his own time.

This matter of amenability to the law, as Mr. Asquith has been pleased to observe, goes right down to the very foundations of our social structure, and touches at almost every point the daily routine and business of the nation. He thought, with Mr. Haldane, that it would pass the wit of man to advise how a strike should be lawfully conducted; but we cannot think either of these high legal authorities does himself justice in taking so low a view of the resources of their craft. Although no lawyer, any shrewd leader of a tradesmen's combination should find no more difficulty now in conducting a strike than he would have done in the days before the Taff Vale and the other recent decisions which have struck dismay into the hearts of the lawless. Indeed, most of the really effective strikes have been ordered with strict legality. The difficulty perceived by

Mr. Asquith is a purely fictitious one, and it proceeds from the initial mistake of assuming that what he called "those "forms of persuasion and pressure without power to exer- "cise which the right of free combination is a delusion and "a sham" are wholly those of which the policeman and the solicitor can take cognizance. If the power of combination means anything at all besides licence to act in common, riotously and with violence, it covers the right of all workmen in any employment to cease working together, in order to bring pressure to bear upon the employer to concede something they have demanded as one man. That is a strike; and so long as no agreements are broken, it is not an offence. If the strikers leave the employer's premises, and post a representative in the neighbourhood to peaceably inform strangers of the nature of their action, that is legal picketing. There is no legal disability in all this.

The difficulty arises, of course, where strikers want to do more than this—to assert a monopoly of claim to an employment they have thrown up, and to carry on picketing with the accompaniments of physical violence and intimidation. Mr. Asquith affected to deplore what might be the consequence "if the great Unions were to abandon their "authority over trade disputes." He thought that it would be "sporadic outbursts, often ill-judged and ill-controlled, "accompanied by much lawlessness, and by a vast amount "of unnecessary suffering." But this is precisely what has happened all along, and would be repeated to morrow if the effects of the Taff Vale and Denaby judgments were annulled. Almost without exception, the worst industrial troubles have arisen sporadically, owing to the precipitancy of some individually insignificant Trade Union official, or else to the machinations of some meddlesome "shop lawyer." This is how the facts contradict Mr. Asquith's arm-chair theory of Trade Union action. Formal declarations of hostilities are no commoner in the industrial than they are in the political world. Wars "break out" far oftener than they are deliberately made. What has happened then is that the quarrel has been espoused by higher powers, who could not afford to disown their own side. If the great Unions could always have had their way, strikes might have been as rare with all of them as in the case of a very few which boast of never having had any. The good effect we expect from the recent decisions is the education in the practice of responsible government of such Trade Societies as are really worth preserving.

A Royal Commission on London Traffic.

The announcement was made last week of the names of the members of the Royal Commission on London Traffic. The investigations of this Commission are likely to go into matters of special interest for readers of the "Journal," inasmuch as they will naturally include the questions of pipe subways, and the practice of main-laying in Metropolitan thoroughfares. The Commission will do good work if it succeeds in discovering and formulating a trustworthy body of doctrine on this kind of public service. At any rate, the mere circumstance of the inquiry being held will tend to put a stop to the publication of much prejudicial nonsense concerning the general subject, which has hitherto emanated both from amateurs and men of some professional knowledge who have not given it sufficient thought. The terms of the reference are wide, and include a suggestion for the establishment of a new tribunal to deal with questions of traffic. The Chairman of the Commission is Sir David Balfour, and Sir John Wolfe Barry will represent engineering in the body, which will include Sir Francis Hopwood, the Permanent Secretary to the Board of Trade. It is a strong Commission, and the conclusions to which the members may agree can be trusted not to be colourless. The proposal to have a central authority, something analogous to the "Bridges and Roads" Department of the French Civil Service, is distinctly interesting. Nobody doubts that this country has suffered materially from the lack of systematized supervision and control of all the main roads. Thus we have endured the abominable nuisance of "break of gauge" between the tramways of neighbouring towns; and in the laying of a trunk gas-main, perhaps the different requirements of several mutually jealous local authorities have to be satisfied. In France, the main or national roads, which connect the towns with each other, are under the control of the National Government, and no local vagaries are permitted to mar their uniform excellence. In London, on the contrary, every thoroughfare lying within the area of a local government body is subject to any self-regarding treatment this body thinks fit to bestow upon it. We have lately had occasion to discuss the powers of gas companies with regard to the public roads, with special reference to the modifications of these provisions in the interests of new claimants to the use of the subsoil of the roads; and we have also considered the case of busy streets in relation to main-laying operations.

A prominent member of the London County Council is in the habit of writing to the daily newspapers advocating such drastic measures as the construction of what are called shallow tramway subways, intended also to accommodate all the mains and cables, underneath such thoroughfares as the Strand. It is a good thing that the Royal Commission has so experienced a member in all such matters as this as Sir John Wolfe Barry, who, by the way, is the author of a notable scheme for the improvement of London street connections between East and West. He will know much better than to encourage such wild suggestions as that of putting all the Strand road traffic downstairs. It will be an excellent thing, also, if this inquiry should result in the appointment of a permanent board of trained persons—not necessarily experts, in the professional sense—to supervise the laying out of future "tube" railways and tramways. Under the existing system, all schemes of the kind are decided upon by a Parliamentary Committee, which is essentially a higher kind of British jury. The weakness of the British jury system is that as soon as a juryman has learnt his business he is discharged, and sometimes rewarded with the promise that he shall not be called upon again for a term of years. Similarly, no sooner has an ordinary Parliamentary Committee acquired a competent knowledge of the subject-matters remitted to the judgment of the members than it is dispersed, and never brought together again. It seems a singular way of cultivating efficiency.

Parliamentary Agents and Commissions to Town Clerks.

If there is good foundation for the charges made, at the Society of Arts last Friday night (see p. 368), by Mr. Campbell Swinton, against Parliamentary Agents and Clerks of local authorities, then a most serious state of things exists which needs the application of an immediate remedial and deterrent measure. With all gravity, he asserted that the Association of Municipal Corporations was instituted by a firm of Parliamentary Agents, with a 33⅓ per cent. commission to clerks who brought to them business in the way of promotion of, or opposition to, Bills. In connection with the Association of Urban District Councils, instituted by another firm of Parliamentary Agents (Mr. Swinton asserts), the same arrangement obtains; and he went on to speak in a way which gives the impression that his charge may be applied pretty generally. If these things are true, then here is an evil which one would not have expected to find in places where probity in the purest form should be found, and where all actions should be far above suspicion. It must be difficult to serve a master honestly with a 33⅓ per cent. interest dangling before one for all the work that can be transferred to the master's agent.

Of course, there are parliamentary agents and parliamentary agents; and some of them have other peculiar little ways of enriching themselves. We have heard of agents who insist on receiving from the poor country newspaper proprietor an advertising agents' commission on parliamentary notices, and even discounts on printer's accounts for work done in connection with parliamentary proceedings. In every channel into which their duties take them, some agents seem to diligently exercise care that they make something extraneous to the legitimate fees they receive from their clients for their agency. The whole system is one for condemnation and exposure; but we are not prepared to assert that all the agents are guilty of such contemptible actions. Mr. Swinton would not say that the particular transaction between parliamentary agents and clerks to which he called attention was "immoral;" but he mildly referred to it as being most inexpedient that clerks should be interested in the promotion and opposing of Bills to the extent of 33⅓ per cent. We do not suffer from the same modesty as Mr. Swinton over such matters as these, and have not the least hesitation in characterizing any such proceeding as "immoral."

All clandestine payments in the way of commissions to servants are repugnant and wrong. If parliamentary agents can afford to hand 33⅓ per cent. to the paid representatives of those they are engaged to serve, then this shows that they are exacting 33⅓ per cent. more in fees from their clients than is just and right. This is robbing the ratepayers to enrich the ratepayers' salaried officers; and honest men will not think the employment of any term too harsh to characterize such procedure. Clerks who are not above accepting commission of this kind would not be above making work for the parliamentary agents; and herein perhaps is the secret of some of the petty opposition to company-promoted Bills which has come under censure in recent sessions. The burdensome expense of parliamentary warfare is constantly being complained of. Could not a start be made in its reduction by a little attention to this question of the 33⅓ per cent.? It would be interesting to hear what parliamentary agents have to say regarding Mr. Swinton's accusation.

Mr. Glasgow on the War-Path.

We heartily welcome the full, lucid, and peculiarly interesting contribution that Mr. A. G. Glasgow has made to our columns this week. The title hardly does justice to what succeeds it; and therefore, in order that all concerned in it and others may not lose the enjoyment that is to be obtained by its perusal, we make this guiding allusion to it. Mr. Glasgow is a strong and piquant controversialist; and his contributions on the particular subject of which he is one of the masters are always stimulating. This one will be found especially so. It is rather a pleasure than otherwise that it is not the "JOURNAL" that is the object of Mr. Glasgow's present attack; for it will be delightful for once in a way to sit by and watch the progress of contention between such men as our correspondent implicates in his article—that is, if Mr. Glasgow's acute denunciation of their methods and statements is sufficient to goad them to reply. We shall not be alone in being surprised if it has no effect in this way. Although the title which Mr. Glasgow has adopted is "Blue Water Gas at Ilford—and Elsewhere," as a matter of fact the article directly deals only very shortly with Ilford, but it does so sufficiently to give Mr. J. H. Brown an opportunity of supplementing the information which appeared in the recent "JOURNAL" article on the subject. Mr. Westcott, too, can hardly now decline to take a fair share in "the burden of securing a just recognition in this country of the carburetted water-gas industry." Mr. Dellwik is also called to account on many points, and in a manner which he cannot very well ignore. Not content with issuing these three challenges, Mr. Glasgow turns an unsparing flow of language on Professor Lewes's "exuberant methods," "wide shooting," and information on this particular subject. Verily, Mr. Glasgow shows marvellous intrepidity in issuing his challenges with such freedom and in the way that he has done. But he believes in the strength of his position; and it is in the interests of truth and knowledge that those whose statements and acts he calls in question should meet his charge fully, candidly, and in a like bold spirit.

Welsbach Capital Reorganization.

The statement lately made in the "JOURNAL," that the Board of the Welsbach Company were busily and seriously deliberating upon a scheme for the reorganization of the capital, receives confirmation in a circular sent out by their instructions during the past week. In fulfilment of the promise made at the last annual meeting, the Board were actually on the point of issuing to the proprietors their recommendations, and were about to call a general meeting for their consideration, when (within a day or two of the issue of the circular) "overtures" were made relating to the business which "may affect the situation and entail modifications in the scheme." In these circumstances, the Board state that they have no alternative but to withhold, for the present, the issue of the scheme. But they promise that, as soon as possible, the recommendations of the Board and the Advisory Committee with regard to the capital shall be sent to the proprietors; and that care shall be taken that they have sufficient time for consideration before a decisive vote is taken. While it is a considerate act on the part of the Board to let the proprietors know definitely that the question of capital reorganization is under consideration, the terms of the circular must be rather tantalizing to the latter, who will now wonder more than ever what is going to happen, what is the nature of the scheme that the Board were on the point of recommending for adoption, and, further now, what are the overtures that have been made relating to the business, and which are considered by the Board of sufficient importance to delay the submission of the scheme to the proprietors. There must be a little further patience; but, in the meanwhile, there will be some satisfaction in the knowledge that, in this momentous matter of capital rearrangement, the Advisory Committee are working with the Board. According to a writer on financial topics in a morning paper, the circular is regarded favourably on 'Change; and on Friday Welsbach stocks were firmer. "It is thought in the market that the Company must have received some proposal from the Austrian Company to buy out the Welsbach interest." The market is always snatching at straws to create a flutter.

Combinations in the Incandescent Supply Trade.

We hope the news is true that the negotiations for combination in the mantle-making trade has fallen, or is likely to fall, through. Few people outside those who are in them like trade combinations; and when they end in the raising of prices of useful articles, the people who compose them become the best hated on the face of the earth. The troubles in this effort to integrate the mantle makers—in Germany especially—are that their ramifications are many; that it is difficult to get them to come to a united agreement; and there are fears that even if, on the surface, there is unity, those makers who are not possessed of consciences that are easily disturbed would soon be doing a little back-door business outside the combination. To be candid, we trust these things are true. It may be fairly supposed that a circular issued last week by the Inverted Incandescent Gas-Lamp Company is an effect of the operations of the Thorium Trust. It states: "Owing to the considerable rise in the price of materials used in the manufacture, please note that the price of mantles for our inverted burners will be raised by 6d. per dozen." The glass-works proprietors of Germany have also got the combination fever; and this affects gas glassware, of which such a large quantity comes to us from Germany. The glass-works proprietors have met at Gorlitz, and have associated themselves "for the purpose of regulating the conditions of the output and prices." Altogether there were 27 works, with 59 furnaces, represented at the meeting. The necessity for the combination is stated to be the great depression in the industry; and the regulation of the prices of goods are to come into force shortly. If there is one thing which enables us to give a welcome to this combination, it is that, to put a stop to the existing surplus output, it has been decided to observe Sunday as a day of rest in all works. As a further aid to this end, it has been determined to arrange a uniform time of operating the works according to the demand for goods. Cannot we have a proposal next for the regulation of the price of mantle forks? Surely some excuse can be found for a combination.

A Good Advertisement.

It is a very usual thing, when looking over the pages of an American newspaper, to come across some striking advertisement emanating from the local gas company; and the same plan is also extensively adopted in other places abroad. Such announcements cannot fail to be of use, if undertaken on a fairly liberal scale, and drawn up in such a manner as necessarily to "catch the eye." The preparation of an advertisement calculated to set people thinking is not a very difficult matter—nothing more is necessary than to set out, and prove by statements of fact, the many advantages enjoyed by gas over its rivals. These advantages are well enough known to our readers, and week by week the "JOURNAL" contains fresh evidence which might usefully be quoted in support of them. Considering all the circumstances of the case, we have often wondered why it is that English gas companies do not more largely avail themselves of the facilities offered by the general newspaper Press for making known the value of the commodity to dispose of which is the object of their existence; and attention has again been drawn to the matter by the appearance last Saturday in the columns of a local newspaper of a long advertisement of the Guildford Gas Company, headed "Facts as to the Consumption and Illuminating Power of Gas." The facts, which are set out in narrative form (somewhat

on the lines now adopted by the various patent medicine firms), occupy somewhere about half a column of the paper; and doubtless many persons have read the statement right down to the last few lines without being aware that it was an advertisement inserted by the Gas Company. Then they are informed that "incandescent and the best flat-flame burners can be supplied, fixed, and maintained, so as to give entire satisfaction to the consumers, by the Gas Company;" and in all probability many of them will apply at the works for the information which is offered on the subject. The facts referred to are extremely interesting ones, and are on the same lines as the particulars recently supplied by Mr. Alfred Colson in an interview with a representative of the "Leicester Daily Post," as noticed in the "JOURNAL" for the 27th ult. (p. 233).

The Recognition of Merit.

It is always held that persons do not fully realize the value of that which they possess until they are in danger of losing it. Does this also apply to corporations, with regard to the officials who serve them? It would seem that, in some cases at least, it does—or else that some corporations are not, until forced to do so, willing to recompense their servants according to what they well know is their real worth. The position of Engineer to the Reading Gas Company, for which applications were recently invited, has been much coveted; and the filling of the vacancy has been of substantial direct benefit to two well-known gas men, as well as to the successful candidate (who, as will be seen from an announcement appearing in another column, is Mr. Douglas Helps, of Redhill). The two gentlemen we refer to are Mr. Samuel Glover, of St. Helens, and Mr. Henry Simmonds, of Bury. It was reported in our issue for the 27th ult. that the St. Helen's Town Council, on hearing that there was a prospect of Mr. Glover leaving them to go to Reading, held a special meeting, at which it was decided to increase his salary from £600 to £800 per annum, on his undertaking to remain with them for a period of seven years. Similarly, as is stated elsewhere in to-day's "JOURNAL," the Bury Town Council have decided to increase Mr. Simmonds's salary from £500 to £750 per annum, on condition that he stays with them for not less than three years from May next. These two instances arising in connection with one vacancy are somewhat striking, in spite of the fact that it is a by no means uncommon thing for the successful applicant for a new position to be offered an increase of salary to remain at his old post. However, there are the facts; and the moral of the story is a very simple one. Readers will probably be at no loss to discover it for themselves. Thus, while congratulating Mr. Helps on his success, we must also congratulate Mr. Glover and Mr. Simmonds upon the Reading vacancy having been the means of their receiving more ample recognition of their merits than was hitherto the case.

The Local Application of Municipal Trading.

Mr. J. A. Bellamy's contribution to the discussion of the subject of municipal trading is particularly interesting, because its lessons are drawn from facts within the scope of his actual knowledge. The Chairman of the Plymouth Gas Company had not to travel beyond the area of the district in which he lives, or the bounds of his own experience, for examples of the difference between municipal and private enterprise in business affairs. How great the difference is may be seen by comparison of the position occupied by the Company over which Mr. Bellamy presides with that of the electricity undertaking which the Progressive Municipality of the town is leading to bankruptcy. In the midst of all the troubles arising from the mismanagement of its municipal affairs, and the ever-present apprehension of the burden of increasing rates, the one bright spot in the outlook at Plymouth is to be seen in the admirable management of its gas undertaking. Gas is cheap, the administration is thoroughly up to date, and the area of supply is being extended. The result is that gas is used by everybody, and though the Corporation have done their utmost to foster electric lighting by laying cables in every direction where there was a chance of picking up a customer, it is not "in it" with the older illuminant. It remains to be seen how the gas undertaking in the neighbouring town of Devonport will fare under municipal control. There the element of competition which the electric light has introduced is narrowed to that of competition between two departments of the Corporation, with the certainty that, whichever gains, the unfortunate ratepayer is sure to lose. Mr. Bellamy takes the view, which will be endorsed by many, that the Corporation would have done very much better by leaving the gas-works in the possession of the Company, and putting the latter under the restraint of the sliding-scale and auction clauses. So far as the immediate future is concerned, gas would probably have been cheaper under these conditions than it is likely to be under the Corporation; and the consumer would have reaped the direct advantage of having the money in his pocket. Now, if there is any profit to be made, it is practically certain that the consumers' and ratepayers' gain will be very remote, for the Corporation have a good many schemes on hand, and profits from gas manufacture will be urgently needed to make up losses on water-works, electric lighting, and other enterprises.

Misunderstandings at Long Eaton.

Long Eaton has a "gas question"—not a big one, it is true, but quite sufficient to make things lively in the town. The Town Council possess an electric light installation (in which they are not peculiar); and they therefore are desirous of lighting the streets by means of this illuminant (in which, again, it must be confessed, they are not peculiar). This is all very well, and is a matter between them and the ratepayers. Unfortunately, however, they have come into conflict with the Gas Company with regard to the ownership of certain property. King Solomon had a very effective method by which he decided a like case between rival claimants; but his proposal would hardly be applicable in the present instance, and as no one has been able to suggest any other plan, the dispute has not been settled in so prompt a manner. It appears that in 1901 the Gas Company put some special incandescent lanterns on the lamps, saying that at the end of two years these lanterns should become the property of the town—this stipulation being made on account of the smaller quantity of gas that would be consumed by them, which saving would in the period named repay the cost. The two years will not have expired until next May; but notwithstanding this, the Surveyor wrote to the Company stating that the Council intended using the lanterns for the purpose of electric lighting—their contention being that the Company fixed the lanterns entirely on their own responsibility, and having once done so they were not entitled to remove them again. The Company inquired if this proceeding was with the sanction of the Council; but no reply was sent to their letter. Instead, the Surveyor proceeded with the wiring of the lamps. Then the fun commenced. The Company sent men to remove the lanterns, which they maintained were still their property; and the Surveyor, on learning of this step, asked the men to desist. The men, however, replied that their orders were to take away the lanterns, whereupon the Surveyor called in the aid of the police. On the Inspector's advice, the men then returned to the gas-works. Next morning they returned, still bent on the removal of the lanterns; but on this occasion the Surveyor marshalled an opposition gang to prevent them from doing so. When this was solemnly related to the Council at their meeting last week, there was some laughter, which goes to prove (however strong the evidence to the contrary may appear) that the sense of humour is not altogether dead within the members. Both parties are now holding their hands, in order that if possible a friendly arrangement may be come to.

An Undignified Squabble.

But what a small matter it all is! As one of the local papers remarks, the proceedings are not likely to redound to the credit of the Council as a practical businesslike body, for an acknowledgment of the first letter on the subject from the Gas Company might have prevented the ridiculous position which has arisen. One would have thought that ordinary courtesy would have compelled a reply to the letter in question; but then, of course, some local authorities have such curious ideas of what constitutes courtesy in regard to their dealings with a gas company. It is to be hoped that in this instance the Council will make up for their remissness in the past by meeting the Company in a proper spirit, and treating them as honourable commercial men, not as people who are seeking to take an unfair advantage of the town. There is, however, a further complication in the matter. The Company—somewhat ill-advisedly, it is to be feared—refused

to pay their rates until they received the amount owing to them for public lighting up to Christmas; and thereupon the collector applied to the Clerk of the Council and received from him instructions to take out summonses against such of the defaulters as he might think fit. A summons was taken out against the Company; and they then sent a cheque for the amount of the rates. The momentous question which has now to be decided is, Who is to pay the 2s. for the cost of the summons? But possibly the Company will not feel inclined to haggle about this, provided the Council meet them generously over the matter of the incandescent gas-lanterns. One cannot fail to note the great zeal displayed by the officials of the Council; perhaps a smaller amount would have better met the needs of the case.

WATER AFFAIRS.

Water Supply at the Colney Hatch Fire.

It was only in the nature of things that the news of the terrible fire in the temporary annexe at the Colney Hatch Lunatic Asylum which horrified London on the morning of the 27th ult. should have been accompanied by the statement that the extent of the calamity was attributable to scarcity of water, the blame for which rested upon the Barnet District Gas and Water Company. When, as unfortunately sometimes happens, an outbreak of fire cannot be checked before it has obtained firm hold of a building, it seems to be considered by many people as quite the proper thing to jump to the conclusion that this is due to an inadequate force of water, particularly if the supply happens to be in the hands of a company. In the present case, such a conclusion seemed justifiable; for one could hardly suppose that an institution like the one in question would be insufficiently equipped with all the appliances necessary for dealing with a fire, or unprovided with a staff specially trained to promptly bring them into use on an emergency. But here, as in not a few other instances, the first hastily-formed judgment has been disproved by a calm investigation of the actual circumstances. At the inquiry opened by Dr. Danford Thomas on the 30th ult., the Medical Superintendent of the Asylum (Dr. W. J. Seward) declared that every provision had been made to guard against fire in the temporary buildings. There were appliances in abundance, firemen on duty day and night, and nurses and members of the staff were trained in fire drill. As far as he could judge, there was a good pressure of water. At the resumption of the inquiry last Thursday, the head fireman deposed to there being sufficient water for a time; but he stated that it slackened, owing to the bursting of the main under the corridor. There was plenty of water to reach the top of the building. This witness said he had heard that some of the firemen had complained of shortness of water; but it was due to the bursting of the main. There was a well in the Asylum, but it had been under repair for several weeks. If there had been a dozen engines at the fire, they would not have been able, in his opinion, to put it out, owing to the construction of the building.

From our readers' point of view, possibly the most interesting evidence was that given by Mr. T. H. Martin, the Engineer of the Barnet Company. He stated that they supplied water to the reservoir in the Asylum grounds, and the authorities were responsible for its distribution. The average daily quantity furnished was about 80,000 gallons; but on the day of the fatality it was twice as much. There were 3½ million gallons of water in the Barnet reservoir when the fire broke out; and everything was in proper order—the pressure on the supply main being thoroughly adequate. Mr. Martin was followed by Mr. Clifford Smith, the Engineer to the Asylums Committee of the London County Council, who stated that the first reservoir referred to had a storage capacity of 168,000 gallons; and when the fire broke out it contained from 130,000 to 150,000 gallons. Very shortly afterwards the main delivering water into it was turned on; so that there was an abundant supply from the Company's reservoir. Moreover, all the tanks in the building were full. Mr. Smith added that he was satisfied that every precaution had been taken to protect the buildings from fire. There were hydrants outside each room in the corridor, as well as external hydrants, fire-buckets, portable fire-engines, and electric fire-alarms; but, notwithstanding that they had all these appliances, he thought nothing short of submerging the entire structure would have been effectual in putting out the fire.

It may therefore be concluded that, whatever may have been the cause of the outbreak, with which we are not immediately concerned, its lamentable consequences were not due to any failure of the water supply, or to the lack of appliances for bringing it into use. It was unfortunate, perhaps, that the artesian well in the Asylum grounds happened to be under repair just when it was most needed; but, in the opinion of an architect who has given special attention to methods for the prevention of fire, the greatest possible body of water would not have made any difference to the loss of life. To this, no doubt, the mental condition of the occupants of the buildings largely contributed. It would naturally be difficult to get them to realize their perilous position, and facilitate the efforts of the staff to extricate them from it. Indeed, we read of one patient who tried to throw a nurse into the flames, and eventually ran into them herself. That the sacrifice of life was not greater than that recorded may, we think, be justly attributed to the heroism displayed by the staff. As to the suitability of the materials of which the buildings were constructed—matchboarding, felt covered with a resinous substance, and corrugated iron—more will most probably he heard as the inquiry proceeds. "Great calamities are the stepping-stones to great improve-"ments," Dr. Danford Thomas is reported to have remarked on its resumption last Thursday; and at its close he elicited from the Chairman of the Asylums Committee of the London County Council the statement that it was not at all likely that they would ever erect such buildings again. It is to be hoped they will not, and that no similar calamity to that which has lately brought Colney Hatch into such painful prominence will ever have to be recorded.

Southern District Association.—We are asked by the Hon. Secretary (Mr. J. W. Helps) to announce that the annual meeting will be held on Thursday, March 19, at the Hotel Cecil. The meeting it will be noticed is a little later than usual. This, we believe, has been arranged in order to help to relieve the congestion of Association meetings that has been occasioned by the fixing of the statutory meeting of the Institution for the 26th inst. Of course, the usual notice will be received by the members of the Southern Association in due course.

A Dellwik Water-Gas Plant for Cape Town.—The Directors of the Cape Town and District Gaslight and Coke Company a short time ago visited the Ilford Gas-Works, in order to see the installation of Dellwik water-gas plant in operation there. They were so pleased with the working of the plant that, after visiting the West Bromwich and Tipton installations, they decided to adopt the Dellwik process at their Woodstock Works, Cape Town, and have accordingly placed the order for a complete installation of 300,000 cubic feet per day capacity with Messrs. R. & J. Dempster, Limited, of Manchester—the blue water gas to be utilized in a similar manner to that now in vogue at the Ilford Gas-Works.

Norden's "Ino" Mantles.—The "United Chemical Works" is a title which will be remembered as having been in frequent evidence at the commencement of the agitation for cheap mantles in this country; but in the future the same concern will be also known among large buyers of incandescent mantles and accessories as Messrs. Julius Norden and Co. They have opened offices and warehouse in Sussex Place, Leadenhall Street, E.C., whence they will be trading in this country in the goods produced at their large factories in Berlin and Aldenhoven (Rheinland), where they can produce something like 60,000 mantles a day. We are informed that they have been giving special attention to the preparation of the materials used in the manufacture of their mantles; and they now claim to have made improvements in both the fabrics and the chemicals used, which will increase the satisfaction in them of mantle users. The firm manufacture mantles to fit any kind of burner and in various styles—either with cotton base, single woven silk base, or double woven silk base. Their new mantles—the "Ino"—are a particularly strong looking article, and give promise of being especially suitable for street lighting purposes. They are of a good uniform shape; are credited with being able to yield, under proper conditions, a light of 80-candle power; and have a reputation for maintaining that high duty. About these points, the makers are satisfied that confirmation will be obtained from samples that have been submitted to a well-known English expert—who is making a thorough test of them. The mantles manufactured with the silk base are strong and yet flexible, and adapt themselves well to the flame of the burner.

ESSAYS AND REVIEWS.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 368.)

BUSINESS has been very quiet again on the Stock Exchange; and the state of affairs is very disappointing. Nothing seems able to arouse it from the listlessness and apathy into which it has fallen, and even good traffics and good dividends could not impart a fillip to Railways. The public is either very overcautious or else has no money to spare. In the Money Market, there was a steady demand, which kept the rate for short loans well up to the mark; but discount was inclined to be easier. In the Gas Market, the volume of business was about up to the level of the previous week; but it was not remarkably animated. Changes of quotation were few, and the general tendency was steady, except in the case of one or two issues which were specially affected. The sensational incident of the week in the gas world—the Gaslight and Coke Company's general meeting—came too late perhaps for its full effect to be seen. The public and most of the proprietors read the proceedings only on Saturday morning; and a half-day was not long enough to digest them in. Gas shareholders have the general reputation of being *douce*, easy-going folk; but affairs in this undertaking have apparently reached a point at which even the most long-suffering begin to turn. It is a matter for very deep regret, for many reasons which we cannot here particularize. In regard to last week's movements, the ordinary stock kept up pretty well to the level of 88 until Friday, when it began to droop, and the next day it fell to 85, and closed weak—the quotation being two points lower. The secured issues were unaffected and remained steady. South Metropolitan was moderately active, and was firm at rather better than 123. In Commercials, the quotations of the newly converted stocks are now officially published. The Suburban and Provincial group was more in evidence; British being especially active. Alliance was higher, and Sheffield "B" gained a point locally. The Continental Companies were very quiet. Imperial was firm and steady; but Union had a further fall to 125. There was nothing noticeable in connection with the remoter undertakings, except that Ottoman was a little easier. The Water Companies were as devoid of incident as usual, and hardly any change in price was made.

The daily operations were: Very quiet business in Gas on Monday, and the only move was a fall of ¼ in Ottoman. Tuesday was just as quiet. Continental Union relapsed 1. Wednesday was remarkably active, with dealings in Gaslight, South Metropolitan, and British. Alliance old rose ½; but Union fell 2. Thursday was inactive and unchanged. Friday was not much busier; and Gaslight ordinary receded 1. Saturday's prices were good, except for Gaslight ordinary, which had a further fall of 1.

ELECTRIC LIGHTING MEMORANDA.

The Award in the Marylebone Arbitration—A Big Price—Doubts in the Council—Where is the "Principle"?

THE Marylebone arbitration award was issued last week, and is to the effect that there is due from the Borough Council to the Metropolitan Electric Supply Company, Limited, the sum of £1,212,000 for the purchase-money and compensation for the Company's interest in the Marylebone electricity supply undertaking and business, and for all damages to be sustained by the Company on account of severance. The circumstances have been mentioned in the "JOURNAL" on several occasions; and the arbitration proceedings were one of the heaviest cases that have occurred under the Electric Lighting Acts. The Company obtained their Provisional Order for Marylebone in 1889; the then Vestry consenting upon terms which were afterwards embodied in an agreement. The parish subsequently became a Metropolitan Borough, and had electric lighting aspirations of its own, to which the statutory powers of the Company proved an obstacle. Meanwhile, the Company obtained parliamentary sanction for the construction of a generating station outside the borough boundary. The borough endeavoured to obtain a Provisional Order in competition with the Company, but learnt that this proposal, involving the employment of public funds to compete with an authorized Company, was impracticable. Thereupon the Council had a conference with the Directors of the Company, and agreed to purchase the local portion of the undertaking, which agreement was confirmed by an Act of 1901. Failing to come to terms, the arbitration was duly held.

The Arbitrators disagreed, and delayed making their award. Meanwhile the business was being carried on by the Company, who continued to expend capital and develop their undertaking; which resulted in leaving certain matters outside the original reference. The award now made is consequently only upon the terms of the original reference as stated, which appears to indicate the necessity of a supplementary arbitration. The settlement, so far as it extends, was mentioned at a meeting of the Borough Council on Thursday, by Mr. E. R. Debenham, the Chairman of the Lighting Committee, who explained that the claim of the Company was for £2,750,000 *plus* 10 per cent. for compulsory purchase—roughly, £3,000,000. As against this, the valuation by the Council's advisers amounted to £600,000. The difference was remarkable, but it may partly be explained by the fact that there was no precedent for anything of the kind, and that the Electric Lighting Acts leave the question of goodwill entirely open. In the circumstances, therefore, the Arbitrators must be credited with having done their difficult and arduous work satisfactorily. Of course, neither party will be pleased with the result, which is substantial evidence that right has been done. Mr. Debenham, at any rate, is of this opinion; and he has expressed himself to the purport that, though the price to be paid is more than his Committee expected, in the end consumers of electricity in the borough, as well as ratepayers, will have reason to be content with the result of the arbitration.

This is as may be. Already, however, the voice of discontent has been heard in the Council. The arbitration costs are said to have run to £50,000, which may easily be believed. An inquiry having been made as to whether the Council are bound by the award, the answer was, of course, in the affirmative. It therefore only remains for them to get the money, and go ahead with the remaining arrangements. At the same time, it can easily be supposed that now the members of the Council have been faced with the cost of indulging in their fancy for trading in electricity supply, they are likely to experience an attack of the cold fit which proverbially follows the hot fit of municipal ambition. There is no other such financial obligation as this on the young municipality, which only a few years ago was in the less responsible stage of vestrydom, when the idea of plunging into business requiring an outlay of a million or two at the start would have been dismissed as an idle dream. It is quite possible that the Borough Council may now reflect that, after all, they can in their corporate capacity do very well without the luxury of an electricity supply undertaking. It is not as if they had been let into it by easy stages, like their neighbours in St. Pancras and over the way in Hampstead. Besides, the money is such a very tremendous sum—as much as the electric lighting capital of all the other Metropolitan Local Authorities put together.

There is to be a special meeting of the Borough Council in three weeks' time, to fully consider the subject, and to receive anything that may come from the London County Council with regard to the necessary loan. Severe will be the searching of hearts in Marylebone in this pregnant interval. It is not for us to discuss the question whether the property is worth the price put upon it. The Arbitrators have decided that, as the Council want it, the value stated is the amount of compensation to which the present owners are entitled. The total capital expenditure of the Metropolitan Company up to the critical date probably amounted to about £2,000,000. The main consideration for the Marylebone people is whether they can gain anything by the deal; and this again depends upon the actual degree of development of the undertaking and the extent of its future possibilities. It will be amusing to note what the amateurs of municipal trading will find to say for their favourite "principle" in this connection. Ordinary men of business, experienced in the conduct of public affairs, have never been so set upon the point of principle in matters of this order as certain lecturers and writers in popular journals who have taken possession of the subject as a speciality. There is nothing like a speciality of this kind for making "copy" out of; but, unfortunately, all the newspaper writing in the world will not serve as security for a municipal loan, nor can a penny newspaper comfort a ratepayer who feels that his rulers have all lost their heads.

Marylebone, as Mr. Debenham predicts, may yet rejoice in its electricity supply undertaking—bought at what the Arbitrators, who ought to know, declare to be a reasonable price. Still, ratepayers who will have to bear the burden of any blunder on the part of their representatives may well have their doubts. It is quite understood, by those who know this kind of business, that the expediency of the municipalization of a supply undertaking is a question of future potentialities. There is in most localities, for example, a time when it is quite safe, and may be advantageous, for the local authority to acquire the gas undertaking. If the opportunity then arises, a bargain satisfactory to all parties may be struck. Later, the conditions may be changed; and the once desirable property will not be worth having at the price. This is a truism; but in face of all the irresponsible chatter about the "principle" of municipal trading, it is desirable to keep to the front the truth that this principle is so much a matter of expediency, that the word is not to be trusted in its usual significance, which ceases to apply.

The Norwich Town Council have decided to invite applications for the vacant position of Auditor of the accounts of the Norwich station of the British Gaslight Company, Limited. The salary offered is £52 10s., to include all travelling and other expenses; and of this amount, £31 10s. is paid by the Company.

THE GRANTON WORKS OF THE EDINBURGH AND LEITH GAS COMMISSIONERS.

DESCRIPTION PREPARED

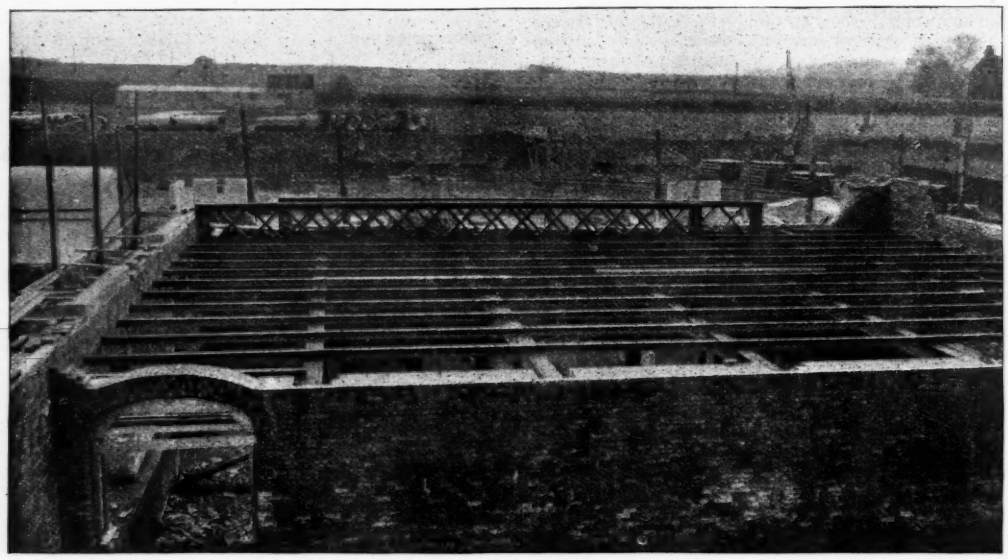
BY

WALTER RALPH HERRING, M.INST.C.E., *Engineer.* *

ARTICLE VI., accompanied by Plate No. 7, which shows the Roof over the Exhauster-House, Mess-Rooms, Lavatories, and Corridor, together with the Structural Steelwork under the Water-Tanks, Floors, &c.

Plate No. 7 gives the details of the structural steelwork and the roofs—including the water-tanks and the corridor contained within the annexe to the retort-house, the general arrangement of which was shown upon Plate No. 4. The details are given in a sufficiently explicit manner to render further reference to the actual parts unnecessary.

The exhauster-house is the principal part of this block—consisting of a room 76 ft. 2 in. by 47 ft. 11¼ in. inside, at the extreme southern end of the retort-house block, forming an annexe thereto. Beneath the exhauster-house, the machinery room is provided for accommodating the duplicate engines actuating the coal and coke handling plant, along with the hydraulic pumping appli-



PHOTOGRAPH No. 31.—The exhauster-house floor, with joists for supporting the floor-plates. (Feb. 8, 1901.)

PHOTOGRAPH No. 32.—The condenser house, with messrooms above. (Aug. 8, 1901.)

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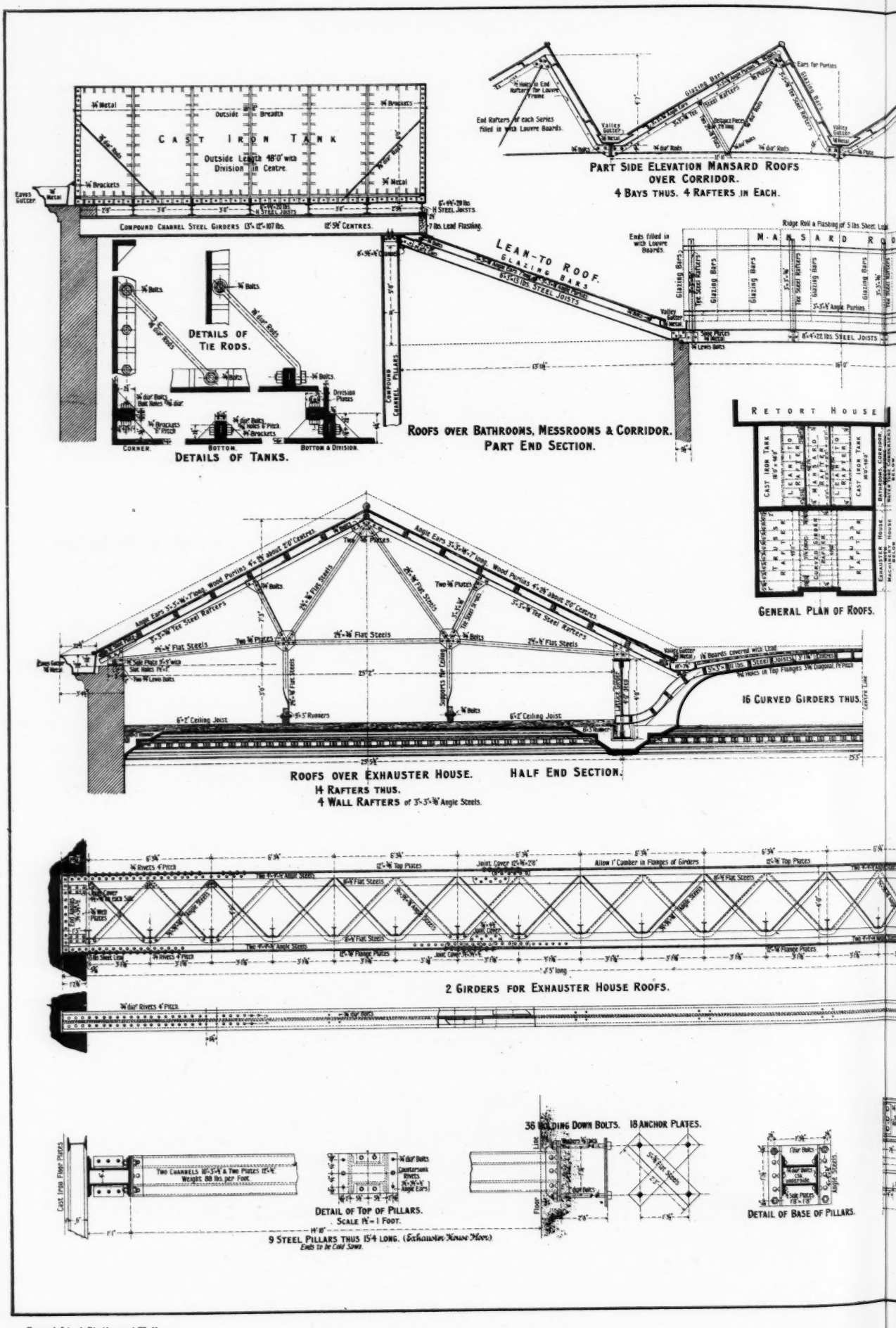
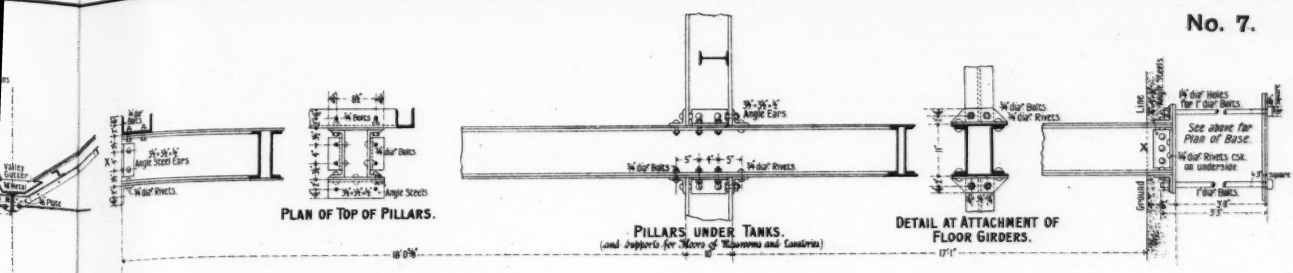
The Granton Works of the Edinburgh

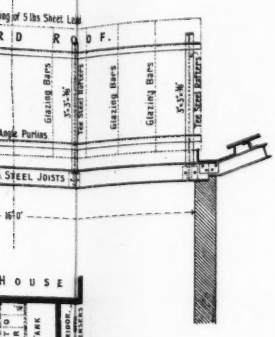

CAST IRON TANK
Outside Length 48'0" with Division in Centre.
Outside Breadth
COMPOUND CHANNEL STEEL GIRDERS 13"×12"×107 lbs. 12'5½" CENTRES.
DETAILS OF TIE RODS.
DETAILS OF TANKS.
CORNER.
BOTTOM.
BOTTOM & DIVISION.
PART SIDE ELEVATION MANSARD ROOFS OVER CORRIDOR.
4 BAYS THUS. 4 RAFTERS IN EACH.
LEAN-TO ROOF.
GLAZING BARS
ROOFS OVER BATHROOMS, MESSROOMS & CORRIDOR.
PART END SECTION.
MANSARD ROOF.
RETORT HOUSE
GENERAL PLAN OF ROOFS.
ROOFS OVER EXHAUSTER HOUSE.
14 RAFTERS THUS.
4 WALL RAFTERS of 3"-3"-⅜ Angle Steels.
HALF END SECTION.
16 CURVED GIRDERS THUS.
2 GIRDERS FOR EXHAUSTER HOUSE ROOFS.
Two Channels 18"-3"-4 & Two Plates 15"-⅝"
Weight 88 lbs. per Foot.
DETAIL OF TOP OF PILLARS.
SCALE 1½"=1 FOOT.
36 HOLDING DOWN BOLTS. 18 ANCHOR PLATES.
DETAIL OF BASE OF PILLARS.
9 STEEL PILLARS THUS 15'4 LONG. (Exhauster House Floor.)
Ends to be Cold Saw.

Copyright at Stationers' Hall.

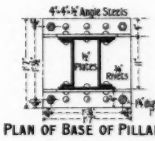
nburgh and Leith Gas Commissioners.

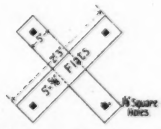
No. 7.

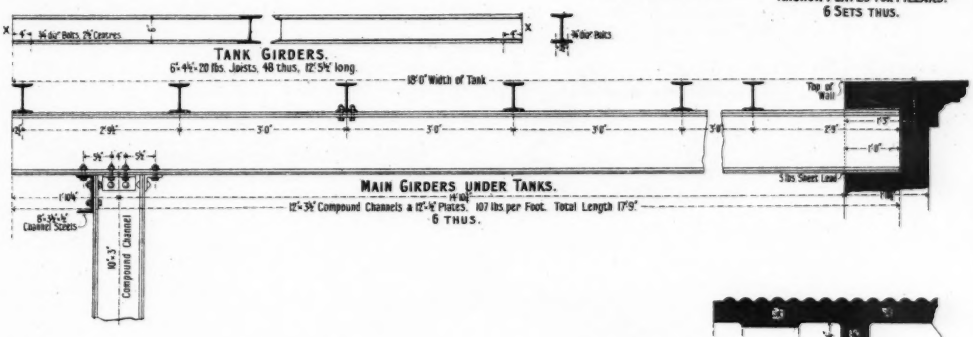

PLAN OF TOP OF PILLARS.
PILLARS UNDER TANKS.
(and Supports for Floors of Tenements and Cottages)
DETAIL AT ATTACHMENT OF FLOOR GIRDERS.
See above for Plan of Base.

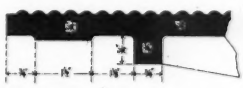


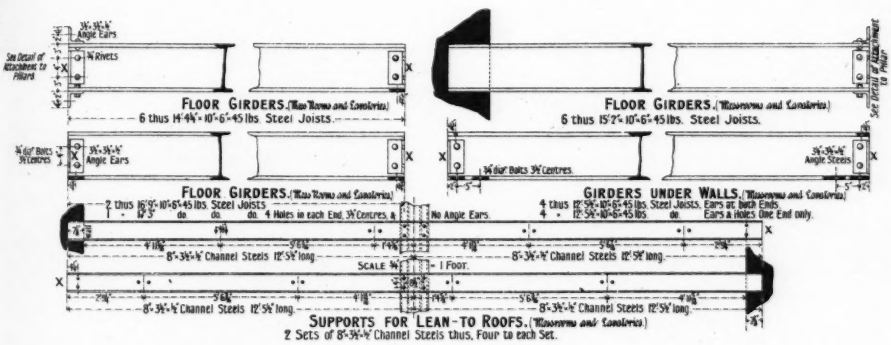
STRUCTURAL IRONWORK UNDER TANKS, &C.

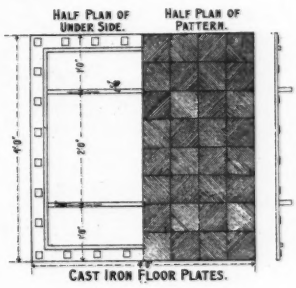


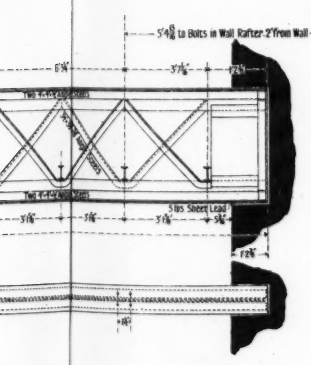


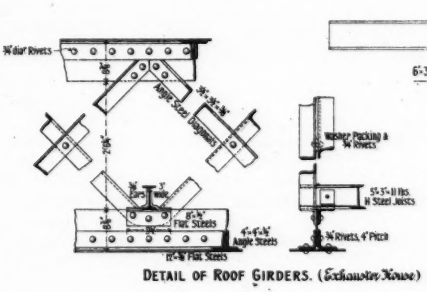

TANK GIRDERS.
6'-4½"-20 lbs. Joists, 48 thus, 12'-5¾" long.
18'-0" Width of Tank
MAIN GIRDERS UNDER TANKS.
12"-35 lbs Compound Channels a 12"-½" Plates. 107 lbs per Foot. Total Length 17'-9"
6 THUS.

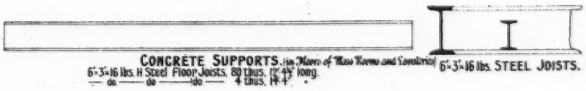


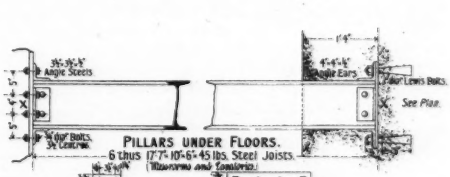

FLOOR GIRDERS. (Blue Rooms and Lavatories)
6 thus 14'-4¾"-10"-6"-45 lbs. Steel Joists.
FLOOR GIRDERS. (Bluerooms and Lavatories)
6 thus 15'-2"-10"-6"-45 lbs. Steel Joists.
FLOOR GIRDERS. (Blue Rooms and Lavatories)
2 thus 16'-9"-10"-6"-45 lbs. Steel Joists
GIRDERS UNDER WALLS. (Bluerooms and Lavatories)
4 thus 12'-5¾"-10"-6"-45 lbs. Steel Joists. Ears at both Ends.
No Angle Ears.
Ears & Holes One End only.
8"-35½ lbs Channel Steels 12'-5¾" long.
SCALE ¾" = 1 Foot.
SUPPORTS FOR LEAN-TO ROOFS. (Bluerooms and Lavatories)
2 Sets of 8"-35½ lbs Channel Steels thus, Four to each Set.

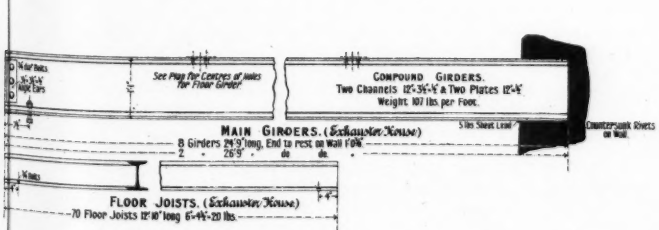







CONCRETE SUPPORTS. (in Rooms of Blue Rooms and Lavatories)
6"-35½ lbs. H Steel Floor Joists, 80 thus, 12'-4½" long.
6"-35½ lbs. STEEL JOISTS.


PILLARS UNDER FLOORS.
6 thus 17'-7"-10"-6"-45 lbs. Steel Joists.
(Bluerooms and Lavatories)
PLAN OF TOP OF PILLARS.
PLAN OF BASE OF PILLARS.


MAIN GIRDERS. (Exhaustion House)
8 Girders 29'-9" long, End to rest on Wall 1'-0"
FLOOR JOISTS. (Exhaustion House)
70 Floor Joists 12'-10" long 6'-4½"-20 lbs.

Note – Ends of Girders & Pillars marked 'X' to be Cold Sawn.

WALTER RALPH HERRING,
M.INST.C.E., *ENGINEER.*

ances, which are also in duplicate. The exhauster connections are suspended beneath the exhauster-house floor. The reasons for placing the exhausters in this position will be subsequently dealt with.

In order to improve the end elevation of this block of buildings, the exhauster-house elevation is struck into two gables, with the central portion carried across level. Details of this construction, together with the ceiling of the exhauster-house, are clearly shown upon Plate No. 7.

Transversely across the building, two girders (47 ft. 11¼ in. clear span) are erected, upon which one end of the principals forming the exhauster house side roofs is made to rest—the outer ends resting upon the side walls of the building. The intervening space in the centre (a distance of about 25 ft. 3 in.) is covered by a slightly arched flat roof, the details of which are shown, as well as the method of supporting the ceiling joists, &c.

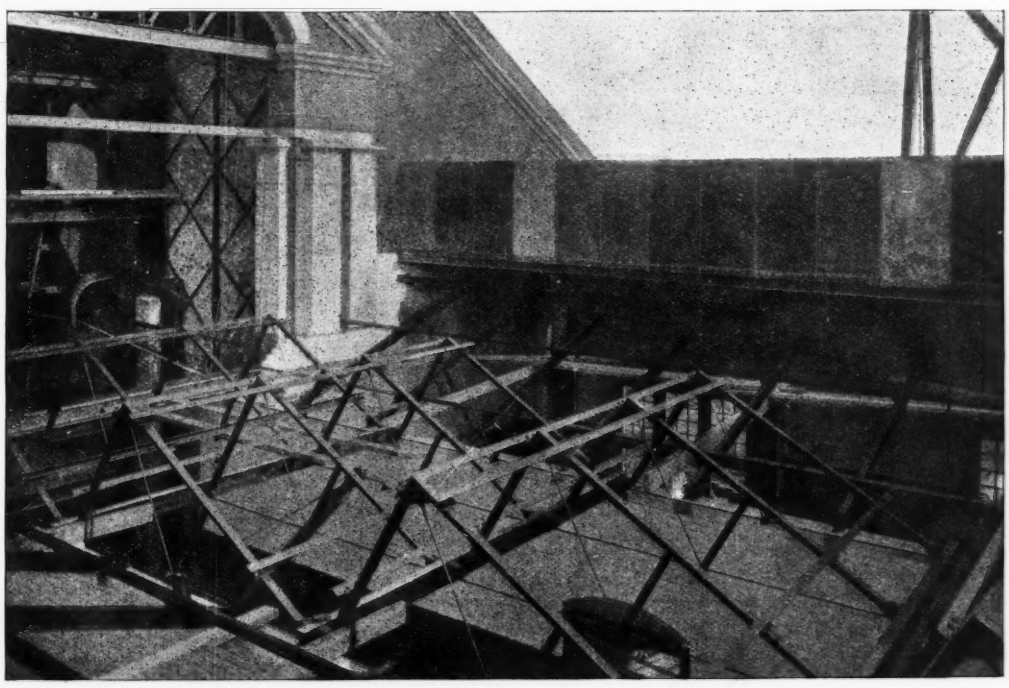
In consequence of the difficulty in procuring large-sized slates, such as would warrant one in putting iron slate-laths on a roof of this descrption, recourse had to be had to slates of a s maller size, and varying at the will of the suppliers. It was, therefore, necessary to close-board the roof with 1⅛-inch grooved-and-tongued floor-boarding, which in turn was covered with tarred felt and slated on the top.

The key plan shown on the centre of Plate No. 7 illustrates the position of the rafters forming the roofs over this building, as well as over the adjoining rooms.

Photograph No. 31 illustrates the standards supporting the exhauster-house floor and the floor-joists laid in position ready for the cast-iron floor-plates. It may be here remarked that, after the plant had been got into position, additional standards supporting the main girders immediately beneath the exhausters were introduced.

The intervening space between the retort-house end and the north wall of the exhauster-house (see Photograph No. 32) is occupied, on the ground floor, by two batteries of water-tube condensers in the centre, with sufficient space on either side forming a store for the spare parts of the machinery used in connection with the coal and coke handling plant, on either side of which—divided by a wall, and communicating direct with the retort-house—is a blacksmith's shop. The upper plates of the water-tube condensers form also the floor of the corridor (shown on Plate No. 4) communicating from the exhauster-house by two short staircases to the charging-stage floor of the retort-house.

On the one side of this corridor (see Photograph No. 32) the workmen's messroom is arranged; on the opposite side, bath-rooms, lavatories, &c. Above the corridor, a glazed mansard roof is erected (see Photograph No. 33), the details of which are shown upon Plate No. 7. Partially covering both the lavatories, and the messroom (see Photograph No. 33), two large water tanks each 48 ft. by 18 ft. by 6 ft. are erected; each tank being divided into two by a central partition plate, in which a valve is fixed to permit of the isolation of either half for cleaning purposes, &c. Details of these tanks and the steel structure supporting the same are given on Plate No. 7. The plate also shows the portion of the messroom, &c., which is uncovered by the tank, and which is roofed by means of a glazed lean-to, supported from the division walls of the corridor and resting against the under structure of the tanks.



PHOTOGRAPH No. 33.—Mansard roof over the corridor, messrooms, and lavatories. (Nov. 7, 1901.)

Midland Association of Gas Managers.—A notice has been sent out to the members to the effect that, in consequence of the statutory meeting of the Institution of Gas Engineers having been fixed for the 26th inst., the annual general meeting of the Midland Association will be postponed from that date to Thursday, March 5.

Prize Competition for Designs for Artistic Gas-Fittings.—The German Association of Gas and Water Engineers have just issued particulars of a scheme for a competition for designs of artistic gaseliers, wall-brackets, &c. Designs, comprising a natural-sized working drawing showing the necessary details and sections for explaining clearly the materials employed and the construction, and a coloured illustration on a large scale, are to be sent (bearing only a motto for subsequent identification) to the Art-Trades Museum at Düsseldorf, by April 15 next. The designs required are one each of a gas-pendant for from 3 to 6 burners, a wall-bracket for from 1 to 3 burners, and a table-lamp, all suitable for domestic use. Four prizes are offered, of the values respectively of 1000, 700, 500, and 300 marks (about £50, £35, £25, and £15). The designs for which prizes are awarded will become the property of the Association, who reserve to themselves also the right to buy any other designs submitted at a price of 200 marks (about £10) each. A court of judges has been formed, including both representatives of the gas industry and professors at the art schools. It is proposed subsequently to hold an exhibition of the designs. Unfortunately, the competition has been limited to Germany, so that the highly artistic efforts of many designers of other countries will not be represented.

Gas from Oil.—With reference to the paragraph stating that two new gas plants have been established lately in California for the manufacture of gas solely from crude petroleum, which appeared in the "JOURNAL" for the 27th ult. (p. 218), Dr. P. Dvorkovitz, the Editor of the "Petroleum Review," remarks that the use of crude oil for gas manufacturing is not new, and there are many places in Russia where, for similar purposes residuals are used. The quantity of gas obtained from the residuals varies from 25,000 to 30,000 cubic feet per ton; and the candle power of the gas is about 35. With the cheap petroleum now available on this market, it appears to him that a change must take place in the method of manufacturing gas from oil. He thinks that, after all, his old suggestion, that the retorts where the oil is gasified should be heated externally and a permanent temperature maintained, is the most rational one, and only thus a large illuminating yield could be obtained, As it stands now, the temperature in the oil-gasifier varies with every run, and the results vary accordingly. There can, adds Dr. Dvorkovitz, be no question that by the introduction of a rational system, gas companies would be very considerable gainers.

ENGINEERING WORKS AND SHOP LIGHTING BY THE HIGH-PRESSURE GAS SYSTEM.

The time does not seem far past when engineering works were considered to be exiled from the advantages of incandescent gas lighting, on account of the necessarily large amount of vibration attending the operations in them, which, it was expected, would be constantly inflicting injury on the mantles, to the detriment of efficiency and to the increase of attention and cost of renewal. But fears on this score were, for the most part, ill-founded; experience since then having proved that the benefits of incandescent gas lighting—the high illuminating power at a cheap rate—can be secured without any undue expenditure of mantles or demands in the way of attention. At first, too, in comparison with the electric arc light, the ordinary incandescent burner had, in the eyes of some works owners, the objection that it meant the multiplication in their large interior spaces of the points of lighting. High-power incandescent gas-burners and the high-pressure gas system met this objection, and provided a (in many ways) superior light at a smaller cost than the electric arc can do; and now, to-day, we find that high-pressure gas lighting is, for the illumination of engineering shops, beating, in fair and square competition, the electrical rival. When engineering works owners, with a predilection for electric lighting, are being convinced, one after the other, of the superior capabilities of gas for their purposes, and adopting it, then we may rest assured that gas has secured very positive points of vantage.

It is a somewhat curious commentary on the continual improvement in detail that has been going on in self-intensifying gas-lamps, that the high-pressure gas system should maintain such a strong hold as it has done on public favour. This is, if the expression may be used, "a feather in its cap." We learnt the other day that very soon there would be fully 1000 of the Keith compressors at work. This is only one system, and just think what it means! Without adopting an extravagant mode of computation, we may reckon that these 1000 compressors are at least equal to the service of lighting installations with an aggregate illuminating power of 5 million candles. Whatever may be thought as to the future of high-power gas lighting—whether the self-intensifying lamp or the high-pressure gas system will eventually hold sway—it is safe to say, with such figures before us, that the all-round perfection of the lighting results of the latter system has obtained for it a strong base from which it will be difficult to dislodge it. It has served the gas industry well, and will continue to do so for many years to come—not only for the lighting of large works, halls, and business premises, but for street lighting as well. In connection with street illumination, it has long since escaped from use only in centralized positions, as is instanced by examples of bridge and street lighting with gas compressed from a single station. A notable example of this is to be found at Ilford, where some fifty shops in the Cranbrook Road are supplied from a special high-pressure main served with gas compressed at a central station. Each shop has fixed in front a 1000-candle power lamp, fitted with Keith's high-pressure burners. This is one of the enterprising pieces of work by which the Ilford Gas Company, in spite of the competition of electricity, have made such remarkable progress in business during recent years; and this special reference may be useful.

Among lighting engineers, the James Keith and Blackman Company, Limited, have been very persevering with their high-pressure system, and have been successful in getting it introduced in many places that, through a prepossession in favour of electricity, looked almost impregnable by gas. To a few of those successes, they have just directed our attention, and a short notice of them may be helpful to gas engineers. The first illustration of this class of lighting shows an extensive interior at the new ammunition works of Messrs. Eley Bros., Limited, at Edmonton. The picture and the installation have interesting points. In the first place, this large piece of lighting was gained for gas in direct competition with electricity. Messrs. Eley had determined to put down their own electric light plant—in fact, had made all arrangements for doing so, when they heard high-pressure gas lighting favourably spoken of. The result is an installation, with a total illuminating power of 62,000 candles. The Keith patent globe reflector fitting and single burners (in many cases 5-feet burners) are used. It will be noticed in the photograph (which is only of a portion of the lighting, and which was taken at night with an exposure of five minutes) that the light is well distributed, and that, notwithstanding the numerous columns, no shadow is cast on the floor. The factory will eventually be three times the size of the present premises. We have only to go next door to

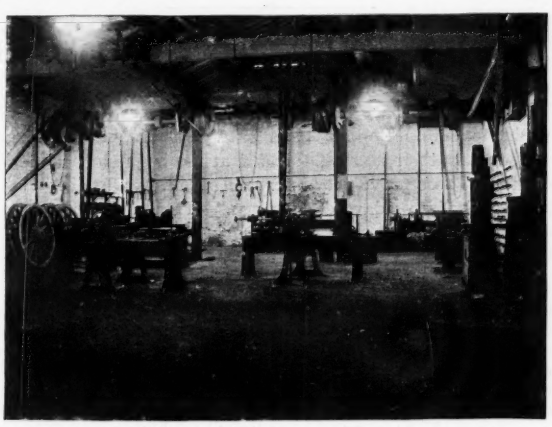
Shop Lighting at Ilford from a High-Pressure Gas-Main.

Night Photograph of Part of Eley Bros' Ammunition Works, at Edmonton.

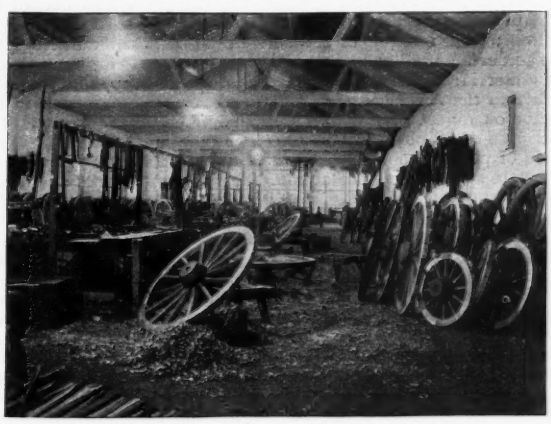
Messrs. Eley's for a second example. The premises here are also new, and are the property of Messrs. Millington and Sons, Limited, wholesale stationers. Like their neighbours they had made up their minds to adopt the electric light. But an inspection by the firm of several installations of high-pressure gas lighting, and consideration of the figures placed before them (in first cost and maintenance the Keith high-pressure lighting will be less than half that of an electric plant), led to the triumph of gas. The installation is equivalent to 68,000-candle power. Single burner globe reflector fittings are used throughout; and the gas-mains are upwards of 1½ miles in length. Another worthy example is found at the engineering works of Messrs. Walter M'Gee and Sons, Limited, of Paisley; and, of a section of the machine-shop, we give a night photograph. In this case, 1000-candle power units are used; but the photograph shows that the light is excellently distributed, which is an indispensable condition for the particular class of work conducted here. The total illuminating power of the installation is 42,000 candles. In this instance again, the electric light was considered, but gas achieved the honour of preference.

From Warwick, Mr. W. T. Tew, the Engineer of the Gas Company, sends us some night photographs of the lighting,

NIGHT PHOTOGRAPH OF M'GEE & SONS' MACHINE SHOP AT PAISLEY.



A VIEW OF GLOVER AND SONS' SHOPS AT WARWICK.



ANOTHER VIEW OF GLOVER AND SONS' SHOPS.

by the same system, of the shops of Messrs. Glover and Sons, in that town. In his accompanying remarks, Mr. Tew says that, at the time the photographs were taken, there were eleven lamps in use. To show the economy of the lamps, the quantity of gas used for seven weeks ending Dec. 31 was only 7800 cubic feet, which, at 2s. 9d. per 1000 cubic feet, works out to £1 1s. 7d. It will be noted that these photographs, too, show an almost complete absence of shadows.

The Belfast Harbour Board also have to deal with situations in which heavy work is carried on. After testing the high-pressure system for two years against all forms of improved lighting, they have decided to immediately put down a further installation of the Keith plant—to render an illumination of 34,000 candles—for their quays and sheds. This is in addition to the existing large plant; and thus we may mark this as another great triumph for gas. At Rotherham, there has been an interesting struggle proceeding for the lighting of the markets; and we have some instructive testimony as the result. The Corporation Electrical Committee did their utmost to capture the lighting, and went to the expense of fitting up ten (so-called) 1000-candle power arc lamps, to which a 6600-candle power Keith installation was opposed. The Markets Committee witnessed a demonstration. The electric arcs were first set to work, and subsequently the high-pressure gas-lights, with the result that it had to be admitted that, if the latter were only of 6600-candle power, then the former fell far short of their claim to being equal together to 10,000 candles. It was agreed on all sides that more light was given by the lower rated gas-lamps. Comparative cost tests for a given period were made; and it was found that the Keith light only worked out to 7·2d. per hour for the 6600 candles, against 1s. 6½d. for the electric arcs (which, though of a total nominal power of 10,000 candles, had been adjudged to be actually of lower value than the gas-lights), exclusive of maintenance. The outcome of the contest is that a definite order has been received by the Keith and Blackman Company to light the markets. The installation will at present be equal to 12,000-candle power; but this will in all probability be doubled.

Such illustrations as these of what is being accomplished by the high-pressure form of lighting in the contest with electric arc lighting are highly encouraging and serviceable to the gas engineer. Apart from the question of supremacy, they show that the prejudice and objections of a few years ago to incandescent gas lighting in such places as engineering works have been broken down, and that gas can, in face of prepossession for the rival illuminant, by the force of an all-round superiority, win favour and adoption—to the benefit of the users and the gas industry generally.

The Manchester District Institution of Gas Engineers will hold their annual meeting at Manchester on Saturday, March 7, instead of the previous Saturday, which has hitherto been the usual date.

Society of Engineers.—The first ordinary meeting of the Society for the present year was held on Monday evening last week, at the Royal United Service Institution, Whitehall. Mr. Percy Griffith, M.Inst.C.E., the retiring President, first occupied the chair, and presented the premiums awarded for papers read during his year of office, among them being the Bessemer premium of books to Mr. Augustus R. Galbraith, for his paper on "The Hennebique System of Ferro-Concrete Construction." Mr. Griffith then introduced the President for the current year (Mr. J. Patten Barber, M.Inst.C.E., (the Borough Engineer of Islington), to the meeting, and vacated the chair, receiving a hearty and unanimous vote of thanks for his services during the past year. The President then proceeded to deliver his Inaugural Address, which dealt entirely with works in which an engineer holding a municipal appointment is concerned. It was listened to with marked attention; and at its close Mr. Barber was accorded a hearty vote of thanks.

A REPORT ON AMERICAN ELECTRICAL ENGINEERING.

A HIGH degree of interest attaches to the accounts published by engineers and electricians of their travels in countries where the engineering and electrical industries are understood to be highly developed. One of the most valuable of such reports that has lately come under our notice is entitled "A Diary of a Tour in America," published in recent issues of the "Engineer;" the writer being evidently an expert in matters of electricity generation and its use for lighting and traction purposes in the United Kingdom. Such a witness would naturally be struck with both the similarities and the differences between the work he is most familiar with at home, and what he saw in the United States. An independent reader of his narrative, while participating in his views of these things, can also see, as it were, over his head, and note the points which are conspicuous by absence from the survey. As regards the much-debated question of the standing—bulk, development, quality, what you will—of electrical engineering in the United States compared with Great Britain, the opinion expressed is that it is no better there than here; but there is enormously more of it. We do not see that this larger volume of business is due to the existence of greater technical facilities—such as power-in-bulk generating undertakings, or anything of that kind—but is rather attributed to the greater freedom of native enterprise in the United States from all the restrictive laws and supervision which prevail here. American joint-stock companies can do anything and everything they please—a condition which is illustrated by the case of the Union Traction Company of Philadelphia, who own all the tramways of the locality, and also a large pleasure park outside the city "mainly for the purpose of bringing custom to the tramways." The witness says he saw the chemical laboratory of the Company where all the materials used are tested, "including the provisions bought for the pleasure park." This is doubtless the way to make business "hum;" but nothing of the sort would be possible in England. Whether for good or bad, the British practice is for a particular commercial undertaking to be organized for a specific purpose; whereas the American idea is that the making of money is the common object of any and every commercial enterprise. The purpose of all business concerns being the same—the transmutation of pains into specie—there is no restriction of their operations to specific kinds of action. A gas company can do electric lighting, or an electricity supply company can run a gas-works, at discretion.

This liberty of action in all directions, while doubtless accounting for much of the volume of business done in the way of electricity, will not account for the whole of it. The very rapid concurrent development of the country itself is another, and perhaps a still larger, factor in the matter. "Many cases exist where there were neither gas lighting nor horse-drawn tramways at the time when electricity became practicable for these purposes; and in such cases, of course, there would be no vested interests to oppose, and no investments to be depreciated. And even where gas and horse tramways did already exist, extensions had constantly to be dealt with, to which electricity would naturally be applied, and would gradually supersede the older work, if necessary, without any sudden or serious writing down of capital." But perhaps the chief of all reasons is to be found in the great enterprise of the financial and business men of the United States—aided, it may be remarked, by the prevailing tendency to make "deals" in every class of investments. Then, as regards the much talked-of scrapping of American manufacturing plant to make way for better, the reporter came across one or two instances where this was done for no good reason, but only because the manufacturers of the new plant had a financial interest in the concern. There are far more cases in which very old plant is still being used, and the tales of American enterprise as regards scrapping are much overdrawn.

There is, obviously, enormous scope in the United States for the spread like wildfire of proprietary electrical plant. Not only is the community growing at a rapid rate, but the growth is almost all in the towns. The American population is being concentrated in centres where the electric tramway and other advantages of material civilization tend to enhance the attractions of town life; and for the time being the country is being drained of producers to support this advance of luxury. Whether the thing is not being overdone is a question that time will solve. The point to be noted is, that all this electrical work does not come cheaper to the American citizen than it does to the Englishman. The American engineers and electricians cannot make coal, or copper, or steel go any farther than we can. In regard to the generation of electric power, the work is certainly not better or more cheaply done. "On the whole, I was a great deal more impressed with the extent of the development of electrical enterprises than with the quality of the engineering; for the magnificent new stations in New York and Niagara, which have been boomed so much over here for commercial purposes, are very far from being representative of the general state of affairs in the States." This is due in a great measure to the monopolizing of the engineering work by one or two firms. Wherever you go, the plant you see is certain to be made either by the General Electric Company or the Westinghouse Company. After swallowing up smaller rivals, and fighting each other till they grew tired, these Companies now amicably divide all big jobs and earn huge profits. This is one way of standardizing work; but it is not the way that makes for cheapness or highest efficiency.

It is rather striking to learn that in the United States, notwithstanding the dearness of labour and the presumed cleverness of the engineers in saving labour by machinery, there are places where the electric power is generated by means of hand-stoked boilers, because "they have tried mechanical stokers here, but found them a nuisance, requiring as many men as for hand firing." This is not a flattering tale. The use of water-tube boilers, without economizers or superheaters, is general. There are none of the triple-expansion steam-engines or high-speed vertical engines which are popular in England—and, apparently, both gas-engines and steam-turbines are scarce. The reason probably is the cheapness of the small, but clean, anthracite chiefly used for fuel. The type of modern American lighting and power plant is very high-pressure alternating, three-phase, transformed down and afterwards turned into direct current at sub-stations by means of rotary converters at low frequencies. The power units are large—from 3000 to 5000 kilowatts—which makes the switch arrangements interesting. There is a great difference in the method of incandescent electric lighting in America; the voltage being only about half the recent English figure. Consequently, there is more copper in the distributing mains. Judging by the lighting he saw, the reporter did not think the average pressure regulation is so good as it usually is in England; so it is no wonder the idea of lighting at a higher voltage is not liked. It is only in New York that the wires are required to be put underground, so that the degree of ugliness which attends the universality of electricity distribution is not a small drawback. The general impression conveyed by this report is that electrical engineering is not really more advanced in the United States than in England, although there is much more of it—of a kind.

FROM EARLY VOLUMES OF THE "JOURNAL."

FOR some time past the leading daily paper and the oldest evening paper in London have been reprinting selected items of news from their issues published at the beginning of the last century. These prove very interesting reading, affording as they do glimpses into "days of long ago." Though the "JOURNAL," of course, does not date so far back as the two papers mentioned, it still has considerably more than fifty years to its credit; and the pleasure we have felt in looking through some of the earlier volumes has suggested the idea that some short extracts therefrom from time to time might be welcomed by our readers. The past half century has perhaps seen quite as much change in the gas industry as has taken place in a hundred years with regard to the world generally. Mercifully, no one is able to see what the future is to bring forth. But all can enjoy the pleasure of dipping into the past; and it is our wish to assist them in so doing. Very many of our subscribers have never even seen the earlier volumes of the "JOURNAL"—the majority were not born when they were issued—and even those who have most faithfully studied its pages may like to have their memories refreshed. At the commencement of its career, the "JOURNAL" was published once a quarter (with intermediate monthly supplements), under the editorship of Mr. T. G. Barlow. The first number, which was dated Feb. 10, 1849, consisted of 24 pages; and the price of it was 1s.—which included the penny Government stamp.

Feb. 10, 1849.

The cry for "cheap gas" in the Metropolis is not so easily disposed of; and our position as independent observers of the temper and spirit of the times gives us greater opportunities for judging of the gravity of the question than those engaged either in raising the storm or attempting to resist its violence. We are not, therefore, without some fears that, unless the movement be checked by prudent and comprehensive measures, the result may be a serious permanent injury to the public, as well as to the owners of Metropolitan gas property. The useless expenditure of capital in new competing works, destined at no remote period to be united in friendly alliance of interest with those establishments they were intended to destroy, has, in our opinion, inflicted a far more serious injury on the public at large than is compensated by the benefit they have derived from the anticipation, by a few years, of reductions in the price of gas, which most of the old Companies were disposed to make as their means allowed. We believe that, during the last twenty years, more than a million has been squandered in this manner, on which the consumer must now pay interest in one shape or the other. The pamphlets and prospectuses of both the contending parties are entirely deficient of proofs in support of their respective views. "The Plain Statement of a Director of the City Gas Company" does not, indeed, attempt to say that 6s. per 1000 cubic feet is the lowest price at which they can now afford to sell gas; nor do the Consumers' Company instance any place where it *has* been sold at 4s. to yield a profit. These subjects are, we presume, reserved for a parliamentary investigation, at a cost to the consumer of

gas, and for the benefit of the legal and engineering professions, to the extent of £100,000 and upwards.

An explosion startled the inhabitants of Edinburgh on Thursday, Jan. 25. An intense vibration of the earth shook the houses near the Canongate. The inmates were in some cases thrown down, and the windows broken. The cause of the disaster was soon ascertained; and the attention of the crowds who thronged to the spot was drawn to a sheet of bright flame, arising from the gasholder of the Edinburgh Gas Company, which told too truly that the immense quantity of gas which it contained had, by some means, caught fire. In another moment the whole was one sheet of flame. The crowds lined the Calton Hill, Regent Road, and the adjoining points from which a view could be obtained, forming, as it were, an immense amphitheatre in the distance. The fire continued to blaze with great fury until gradually, as the gas was consumed, the gasholder became immersed in the tank amongst the water beneath, and the conflagration was ultimately extinguished by means of wet blankets and coarse sacking being spread over the shattered remains of the gasholder. The mysterious part of the matter is by what means the gas in the holder became ignited. There were in the gasholder at the time nearly 300,000 cubic feet of gas, the greater portion of which would, of course, be consumed. The damage was estimated at about £20,000.

THE HEARD FUND.

Third List of Contributors.

We are glad this week to be able to acknowledge some further contributions to this fund. In sending his subscription forward, Sir Frederick Mappin is good enough to promise further help if required; but we feel sure that the generous response which has already been made to our appeal will be amply sufficient to meet the needs of the case—at all events, no more money will be wanted for a considerable time to come. Mrs. Heard, in a letter dated the 3rd inst., asks us to kindly convey her sincere thanks to all those who, by their kindly aid, have helped to smooth her last days, and have given her so many comforts she could not otherwise have enjoyed. She prays that God may reward all those who have so benevolently assisted her.

Brought forward	£38	12	6
Drakes Limited (Halifax)	1	0	0
Gibbons Bros. (Dudley)	0	10	6
B. Gibbons, junr., Ltd. (Dudley)	0	10	6
Sir Frederick Mappin (Sheffield)	5	5	0
Henry Sainsbury (Trowbridge)	0	5	0
	£46	3	6

OBITUARY.

James Glaisher.

It is with much regret that we have to record the death last Saturday, at his residence at Croydon, at the advanced age of 93, of Mr. James Glaisher, F.R.S., for many years Superintendent of the Magnetical and Meteorological Department of the Royal Observatory, Greenwich. Deceased was known the world over for the important work he carried on in connection with meteorology, and for the adventurous ballooning ascents he made in conjunction with Mr. Henry Coxwell; no fewer than 29 being undertaken between 1863 and 1869. He was an active writer, and was the author of more than a hundred books and papers relating to astronomy, meteorology, and the theory of numbers. His work on "Travels in the Air," in which he gives an account of his various ascents, appeared in 1880. He retired from the Royal Observatory in 1874. He was elected a Fellow of the Royal Society in 1849, and founded the Royal Meteorological Society, of which he was Secretary for nearly twenty years, and President in 1867-8. He also occupied the chair of the Royal Microscopical Society and the Photographic Society. In 1880, he became Chairman of the Executive Committee of the Palestine Exploration Fund, after having been a member for upwards of twelve years; and on April 7, 1898, on entering his ninetieth year, he was presented by the Committee with an address of congratulation. Mr. Glaisher will probably be best remembered by our readers for his connection with the Crystal Palace District, Barnet, Harrow, and Hemel Hempstead Gas Companies, of all of which he was a Director; and he was Chairman of the Barnet and Harrow Companies until advancing age compelled him to relinquish the positions. He was a prominent Freemason, and was the first (and for many years) Treasurer of the Evening Star Lodge. The funeral is announced to take place at Shirley Church, Croydon, to-morrow, at half-past twelve.

We regret to place on record the death, on the 27th ult., as the result of an attack of pneumonia, of Mr. R. Ross, the Manager of the Dungannon Gas Company. Prior to taking this appointment, some twenty years ago, deceased had had varied experience abroad, having fulfilled engagements in Hong Kong, Singapore, and Georgetown (British Guinea), as well as in Denmark and in North America. Under his supervision, the works in his charge at the time of his death had been very considerably improved. He was a member of the Irish Association of Gas Managers; and his funeral on the 30th ult. was attended by the Vice-President and Secretary (Mr. James Whimster, of Armagh) and several of his colleagues. Mr. Ross was 74 years of age.

PERSONAL.

Mr. James Shiell, of Berwick, has been appointed Manager of the Innerleithen Gas Company, in place of his brother-in-law, Mr. Laurence Bell, who has resigned.

Mr. H. Francis, M.Inst.C.E., who is relinquishing the position of Engineer of the Devonport Water-Works, after filling it for nearly 35 years, is about to commence practice on his own account.

At the meeting of the Institution of Civil Engineers last Tuesday, it was announced that five associate members had been transferred to the class of members. Among them were Mr. W. Morris Gale, of the Glasgow Corporation Water Department, and Mr. G. Day Harrison, Engineer and Manager of the Staffordshire Potteries Water-Works.

In recognition of his great public service to Manchester, by the gift of the Delamere Forest Sanatorium for Consumptives, Mr. W. J. Crossley has recently been presented with the freedom of the city. The casket containing the illuminated scroll had on one of the front panels a view of the building, which cost about £70,000. The Lord Mayor made the presentation, and referred in eulogistic terms to the philanthropic spirit displayed by Mr. Crossley in endeavouring to relieve the sufferings of his fellow-creatures. In acknowledging the gift, Mr. Crossley related how, in association with his late brother, Mr. Frank Crossley, he introduced practically a new trade to Manchester—he might almost say to England; and with the memory of his brother he said he desired to share the honour just conferred upon him.

The appointment of Engineer and Manager to the Reading Gas Company has fallen to Mr. Douglas H. Helps; and, on his success, the congratulations and good wishes of his friends and confrères will come from near and far. The honour that the appointment confers upon him is enhanced by the fact that he was selected out of 76 applicants. Of this, we are sure, that he will do his utmost to prove himself worthy of the honour and of the higher position to which he has been called. Mr. Helps, as is well known, is the son of Mr. George Helps, the late Secretary of the Bath Gas Company, and brother of Mr. James W. Helps, of Croydon. His entrance into the gas industry was made at the Weston-super-Mare Gas-Works, where he served his articles as pupil. In 1884, he went to the Croydon Gas-Works, and soon after received the post of chief assistant to his brother. While in that capacity, he had exceptional opportunities for gaining an all-round experience, as, during the period, the productive power of the works was, by many important alterations and additions, more than doubled. In January, 1898, Mr. Helps entered into his present position, as Engineer and Manager of the Redhill Gas Company. At that time, he found the consumption of gas had practically overtaken the capacity of the works. This condition of things required his immediate attention; and since then the following extensions have been made, leaving out of consideration less important work: Two sets of carburetted water-gas plant, new boilers and exhausters with buildings for them, new gasholder, alterations to retort-settings, sulphate plant, &c. During the same years, very careful attention has been paid to the commercial side of the Company's business, and endeavours made to teach the public the true value of gas as compared with electricity. The Company were one of the first to adopt the maintenance system for incandescent burners. Since doing away with certain restrictions in connection with the rental and fixing of cooking-stoves, the proportion of consumers using them has increased from 19 per cent. in September, 1900, to about 50 per cent. at the present time. The prepayment consumers also now outnumber the ordinary ones. The district has, of course, not been neglected; many new gas-mains having been laid, and the supply on the outskirts of the town greatly improved by certain alterations. The double experience that Mr. Helps has had with naphthalene has made the subject one of unusual interest to him. Naphthalene was the bugbear at Croydon; while at Redhill, with the same kind of coal as that used at Croydon, and a high yield of gas per ton, he has been quite free from it, both on the works and in the district. This comfortable position of things may not be met with at Reading. Such varied experience will be very useful to the Sub-Committee appointed by the Southern District Association to report on the naphthalene question. Of that Committee Mr. Helps is a member. During his management at Redhill, the Company have had, as will have been gathered, to spend a large amount of capital, and also meet the considerable increase which took place in the price of coal; but Mr. Helps leaves his first full official engagement with the knowledge that, notwithstanding these heavy outlays, the Company are paying their whole statutory dividends.

COMMUNICATED ARTICLES.

BLUE WATER GAS AT ILFORD—AND ELSEWHERE.

A Statement

By A. G. Glasgow, M.Inst.C.E.

When Mr. Westcott challenged the "Journal's" references to blue water-gas at Ilford, I hoped that a champion had arisen willing to assume, or at least share, the burden of securing just recognition in this country of the carburetted water-gas industry. I was, therefore, sincerely disappointed when, even under the spur of Mr. Dellwik's disingenuous letter, he confined his argument to an economical *ipse dixit*. To meet claim with counter-claim has never appealed to me as a form of controversy; and, inasmuch as carburetted water gas now comprises almost a moiety of the gas industry of the English-speaking race, and, inasmuch as the responsibility of representing its technical status in this country appears still to devolve upon me, I feel that I must again solicit the hospitality of your columns to that end.

I may begin by stating that I have no quarrel with the details of cost of blue water gas quoted in the "Journal" article of Dec. 30, 1902, entitled "Notable Experiences with Blue Water Gas at Ilford." Mr. Brown gives "cost of blue water gas per 1000 cubic feet—3·48d.;" but, as he states the manner in which he arrives at this cost, it is evident that the figure is incomplete. It does not even include the bare generating cost of the gas; while, to arrive at the holder cost, we must add to his figure—

(1) Boiler fuel.
(2) Purification.
(3) Wear and tear—being the whole wear and tear on the generating plant, and that proportion of wear and tear on the general works, from hydraulic mains to storage holders inclusive, represented by the percentage of blue gas introduced at the hydraulic main.
(4) The proportionate expense of exhausting in common with the coal gas.
(5) The proper share of management, office, yard, and incidental expenses.
(6) The margin required to convert the results of his 18 hours test into routine working.

In the latter respect, Mr. Brown states that during six months the average yield of blue gas was 63,000 cubic feet per ton of generator coke, as compared with a yield of 75,806 cubic feet per ton during his brief special test. This represents an increase of exactly 20 per cent. in the item of generator coke included in the so-called cost of 3·48d. per 1000 cubic feet, and increases this figure to exactly 4d. per 1000 cubic feet. Omitting any similar increment in labour or other items under cause 6, I find that the additional expenses due to causes 1 to 5 will make a total holder cost of nearly 7d. per 1000 cubic feet. I have been accustomed to take 6d. per 1000 cubic feet as a rough general holder cost of blue water-gas in this country; and the higher indications at Ilford are due to the local price of the coke and to the admission of the blue gas at the hydraulic main. I repeat, therefore, that I have no fault to find with the figure of partial cost given by Mr. Brown, inasmuch as any one possessing common knowledge of the subject can readily estimate the additional costs necessary to cover the gas in the holder.

But while I do not seek to fix any responsibility upon Mr. Brown, or upon the article published in the "Journal," I unreservedly denounce the wide and mischievous use which is being made of Mr. Brown's figure. I venture to believe that even the lax ethics of trade are violated when people, responsibly circumstanced, publish the arguments and figures in Mr. Dellwik's letter of Jan. 13, or, on the other hand, circularize the gas industry with the query, "Why grumble at the price of coal when you can make *carburetted water gas* at less than 6d. per 1000 cubic feet from coke costing 16s. 8d. per ton?"—pointing to the Ilford test in demonstration thereof. This "yellow" leaflet also contains a stirring tribute to the Dellwik generator, at the expense of the Lowe process, extracted from one of Professor Vivian B. Lewes's Cantor lectures, to which I shall presently refer.

Experience has shown me that public exposure of their errors has no influence in preventing the German promoters of the Dellwik-Fleischer generator from advertising fictitious comparisons with the Humphreys-Glasgow apparatus (by name). But I had a right to expect better things of Mr. Dellwik himself, inasmuch as he has iterated to Mr. Humphreys the expression of his humiliation at the course pursued by his German associates. Notwithstanding these apologies, and in spite of the public exposures by Messrs. Julius Pintsch of the Dellwik-Fleischer methods of deducing fictitious fuel results from our plant (as summarized in our letter last May in "Het Gas" and in the "Journal" for Jan. 20), Mr. Dellwik now publicly advocates one of these means.

This absurd plan presupposes that the Lowe and Dellwik generators perform exactly similar duties; but, as this assumption is negatived by the fact that the Lowe plant produces not blue gas, but illuminating water gas of 2 to 2½ times the calorific power of blue gas, the "inconsistency" is neutralized by deducting "at least 25 to 30 per cent." from the volume of carburetted water gas produced. By charging the residue, of supposed blue gas, with the whole of the yard coke (and moisture) fed into the generator, during extended periods of intermittent working, a figure is created for comparison with brief special tests of the Dellwik simple blue gas generator.

Only personal experience could have convinced me that so puerile and disingenuous a scheme could have met with corresponding credulity. Surely it must be generally known that the Lowe process was devised over twenty-five years ago to perform *with one fire*, coincidentally, operations which hitherto had been divided between a simple blue-gas generator and independent benches of retorts for gasifying the enriching oil, as exemplified in the Tessié du Motay system—which, parenthetically, has just been resurrected at Cleethorpes. Yet latter-day prophets would instruct us that the single fuel bed of the Lowe process performs no more work than the simple generator manufacturing blue-gas alone; that none of the fuel burnt in a carburetted water-gas generator is applied to the gasification of the enriching oil. They stoned false prophets of eld; but the Ancients possessed virtues lost to the present day.

It is now sufficiently difficult to get steady gas makers at 5s. a day; but Mr. Dellwik apparently expects this sum to include some magic art. Does he suggest that the gas maker by (say) breathing on the oil-meter can transmute 3 gallons per 1000 of cold oil into permanent oil-gas? Then another man of equally potent breath might convert the steam into water-gas, and abolish the generator altogether!

Of course, the plain fact is that the consumption of fuel in a Lowe generator varies with the quantity of oil gasified in the fixing chambers heated by the generator. This self-evident feature is practically illustrated in the fact that, for the same length and degree of steaming, the blowing periods are (approximately) four minutes for 30-candle gas, two minutes for 15-candle gas, and one minute for blue-gas. It is a significant fact that the adverse critics of the Lowe process are invariably those who have been unable or unwilling to grasp its fundamental principles—ignorantly or wilfully assuming, for instance, that because a blow of four minutes is required for a certain duty, it must still be required when that duty is halved or abolished. It is further somewhat significant that subsequent patentees invariably attempt to establish comparative economy by ascribing *fictitious* results to the Lowe process.

It goes without saying that gas managers with many and exacting local responsibilities cannot maintain specialists' knowledge of every branch of the gas industry throughout the world; but it is, nevertheless, regrettable that British gas engineers are not more generally acquainted with the technical history of the water-gas industry in the United States, even if only to note the derelict heresies and processes submerged in the tide of progress. During the last dozen years, no attention has been paid by recognized experts in the United States to the manufacture of blue water-gas *per se*. But prior to that we suffered from a protracted craze for "cheap" gas (called in America "fuel" gas); and the experience then gained was at a cost likely to stamp itself on the memory of all concerned. Those who are willing to profit by such experience will do well to study Mr. Shelton's paper presented to the Western Gas Association in 1897, entitled, "The Failure of the Commercial Attempts to Supply Fuel Gas in the United States," covering the period from 1880 to 1896, and including 27 independent enterprises.*

The United Gas Improvement Company, owning the Welsbach patents and important gas-works in every part of the United States, were naturally touched with the "fuel" gas craze, to the extent of corroborating the final verdict by their own practical attempts to distribute town supplies of "fuel" gas. They were forced to recognize then, what remains equally true to-day, that the independent manufacture of blue water-gas *per se* has no economic place in a general town supply, and that the only economical use of blue-gas for town purposes was in admixture with oil-gas of high calorific power and luminosity. Their later efforts were, therefore, exclusively directed toward the development of the efficiency of generators performing the dual work of producing blue-gas and oil-gas concurrently. Compared with such a task, simple blue-gas manufacture was child's-play; but so broad and successful has been this technical interpretation of the Lowe principle, that any single installation of modern Lowe plant is capable of making any candle power of permanent gas, from any merchantable grade of coke and oil, with a thermal efficiency unsurpassed by any simple blue-gas generator in existence. The present practical result is that no carburetted water-gas process other than the Lowe is now adopted in the United States, and no water-gas other than carburetted water-gas is distributed in that country.

It appears that the Dellwik promoters would impose upon the gas profession the view that the Dellwik generator represents new and economical principles previously unknown to the art; but, in view of the above facts, it is incontrovertible that, in

* See "Journal," Vol. LXIX., p. 1497; Vol. LXX., p. 692.

scientific generator practice, those responsible for the development of the Lowe process were ten years in advance of Mr. Dellwik's belated contribution to the blue-gas industry. The Dellwik faction are merely applying to simple blue-gas generators the principles which, for the past fifteen years at least, the United Gas Improvement Company and their colleagues have successfully adapted to the dual and complex purposes of the Lowe generator. Anyone wishful to test my historical accuracy may refer to a paper entitled, "The Thermal Efficiency of a Carbureted Water-Gas Setting" which I read before the American Gaslight Association in 1890.* The tests described therein were simply careful observations of the routine working of Lowe apparatus designed over sixteen years ago; and its opening "apothegms," which to-day crystalize and govern modern generator practice, were then common knowledge to the large responsible staff of the United Gas Improvement Company.

To make this portion of my statement more explicit, and as a matter of record, it may be well to consider briefly what is contemplated in the Dellwik patent. The "method" claim reads:

> In the production of water-gas the admission during the air supply period of such quantity of air, or the use of such air pressure as to obtain during the said air supply period the most perfect conversion possible of the fuel to CO_2, so that the combustion gases of the air supply period always contain more CO_2 than CO.

Quite apart from any question of novelty, one need not be a patent expert to understand that no privileges can attach to such a claim. No patent can monopolize *general conditions of economy*, or prevent *the most economical use* by its possessor of an appliance lawfully operated. A patent official cannot override the common law. Therefore, when notified of this claim, I saw no reason for educating Mr. Dellwik through the medium of a protest. Messrs. Julius Pintsch, however, determined to place their views upon record; and the report of the evidence submitted *pro* and *con* this patent makes interesting reading.

There are, however, some useful inferences to be drawn from the phraseology of the claim. Firstly, the closing limitation to the claim contradicts the very nature and expression of the claim itself; secondly, the whole wording of the claim reflects an imperfect grasp of the fundamental phenomena of intermittent water-gas practice. For instance: After the period of steaming, as commonly practised, the immediately succeeding blast products contain no CO whatever, owing to the chilled condition of the fuel bed and the large volume of the blast. But as the fuel bed recuperates its heat, the percentage of CO in the blast products rapidly increases, while the percentage of CO_2 decreases at a corresponding rate. Whether these percentages approach, meet, or pass each other is, for a given rate of blast, dependent upon the *length* of the blow; which *inter alia* is dependent upon the duty required of the generator fire (being a dual service in the Lowe process), and the temperature of the fuel bed at the end of the steaming. This latter point, in its turn, is governed principally by the percentage of CO_2 tolerated in the blue water gas, which is a function of the rate and length of steaming. Therefore, if gas making be conducted at a low temperature, with less perfect conversion of the oxygen of the steam to CO, the succeeding blast gases will, for a correspondingly longer period, be free from CO. Hence, it is evident that in blue water-gas practice the character of the blast products depends as much upon the method of steaming, or upon the length of the blow, as upon the rate of blowing—the three being interdependent. Without any change whatever in the blast-rate, the character of the blast products may be completely altered by merely varying the conditions of steaming or the period of blowing. These essential facts are unrecognized in the above patent claim.

To broaden the illustration, *all* generator adjustments are interdependent—viz., rate, period and direction of steaming, rate and period of blowing, and the height and character of the fuel bed; and not one of these conditions can be changed, independently of the others, without altering the character of both the blue gas and the blast products. It is the complete range of independent adjustment afforded in these and in all other respects which enables modern Lowe plant to cover with such high efficiency a field of operation stretching from blue water gas to semi oil gas. Conversely, for the above reasons, the substitution of the Dellwik generator for the present generator in carburetted water-gas plant would be inimical, if not disastrous, to the efficiency of the Lowe process.

This brings me to the statement by Professor Lewes in his Cantor lecture of Dec. 1, 1902, to which I have promised to refer. To facilitate its consideration by any patient reader who may have followed me thus far, I will quote the extract as advertised by the Dellwik promoters:—

> Many experiments have been made with a view of seeing if the generators utilized for making water-gas for the formation of carburetted water gas could be used on the Dellwik lines. It was soon found, however, that the alterations necessary cost far more than a new plant, and that an increase in the amount of air blast is by no means the only thing necessary to give the improved results, as, unless, this is accompanied by a careful regulation of the ratios between the fuel, grate area, and air blast, but little improvement can be obtained.* In America, many attempts have been made to get away from the Dellwik patents by experiments in this direction; and I was pleased to hear the other day from one of the leading water-gas makers in America that, although he had blown his generators until, as he put it, the country round was an inch deep in ashes, he had absolutely failed to get any result approaching that given by the Dellwik plant.

In view of what I have already written regarding the principles of blue water-gas manufacture as practised in the Lowe process, I do not think I need go into further detail when I unqualifiedly deny and repudiate Professor Lewes's assertions which attribute comparative inferiority to the technical working of standard Lowe generators. But, whatever others may think on the subject, I shall also enter a public protest against the mischievous habit of delivering public decisions upon current issues, based upon superficial information or ignorance. It is one thing for specialists in trade or industry to urge their wares, for their expressions are recognized to be *ex parte;* and unless their exhibits and arguments are logically convincing, their statements are without serious effect. But, when the Society of Arts employs a professor—of magnetic and convincing personality—to deliver addresses for the general propagation of technical knowledge, it is to be supposed that he will survey his subject with a broad and impersonal perspective, and not lapse into advertising special plant, whether patented by himself or others.

My first experience of Professor Lewes was at the 1893 meeting of the Institution of Gas Engineers, when he presented a paper comparing his patented "carburetted hydrogen" process with the Lowe process. It will be within the recollection of some in attendance, that, at the moment of reading his paper, Professor Lewes asked that paragraphs referring to the Beckton results be expunged, explaining that he had been misled by someone described as "a highly competent authority, who has had the opportunity of most thoroughly testing the capacity of the plant over an extended period, and gives as the average working results 1000 cubic feet of 22-candle power gas with an expenditure of 5·75 gallons of oil and 60 pounds of coke."

Professor Lewes gave the following estimate of the cost of carburetted water-gas of 22-candle power changed to 25-candle power during the reading of the paper:—

Oil, 5·75 gallons at 3d.	1s. 5¼d.
Coke, generator and boiler, 60 lbs. at 12s. 6d. per ton	0 3½
Labour	0 1½
Purification	0 0½
Repairs and charge on plant	0 1
Superintendence	0 0½
Water	0 0½
	2s. 0¾d.

This estimate was qualified: "But it must be clearly borne in mind that it could not be made on a smaller scale at this price."

The oil results thus ascribed to the Lowe process were:

Original 22 candle power	765 candles per gallon
Revised 25 " "	870 " " "

Now when lecturing before the Petroleum Institute, March 24, 1902, Professor Lewes gave the cost of carburetted water-gas of

16 candle power	12·13d.
22 " "	13·88d.

with the endorsement "these are working figures taken over a long period of absolute practice." He further states: "It is interesting to note the candle units per gallon of oil obtainable by gasification under the conditions existing in carburetted water-gas plant: and a fair average over all practice is 1450 candle units." This figure of 1450 candles is 70 per cent. and 90 per cent. respectively above his former figures.

This wide shooting at least points one instructive moral—namely, that Professor Lewes, who is now delivering his verdict upon the complex thermal side of the Lowe process, is apparently no better informed on that difficult subject than he was concerning its simple oil results. Doubtless the next decade will clarify his thermal vision, as the past ten years has improved his sight for oil efficiency.

The Lowe process is still operating at Beckton, on a greatly extended scale, and at over a hundred other British works: but where is the Lewes "carburetted-hydrogen" process? Indeed, the "hydrogen" scheme was past history when patented by Professor Lewes; for, as I pointed out to the meeting, it was patented in 1883, tried, and abandoned in the United States, where its original patentees subsequently drifted into such adoption of the Lowe principle, that they were closed up by the United Gas Improvement Company.

I then marvelled that a man of such brilliant parts should risk a fiasco, rather than trouble to obtain the official Beckton results, and examine into the general state of the art. But subsequent events indicate that the incident was less phenomenal than characteristic.

Finally, I repeat my protest against the application of such exuberant methods to contemporary technics.

* See "JOURNAL," Vol. LVI., p. 1338.

* Extract from a paper read by Mr. Glasgow at the 1893 meeting of the Institution of Gas Engineers: "It is essential that carburetted water-gas apparatus be so designed that a perfect working balance is maintained between the demand for energy in the fixing chambers and that supplied by the generator when on blast, in spite of wide variation in the quality of the fuel. This equilibrium involves, broadly speaking, a correct relation between the area and depth of the generator fire and the blast pressures throughout the apparatus."—See "JOURNAL," Vol. LXI., p. 874.

FANS IN GAS-WORKS.

By R. Gordon Mackay, Assoc.M.Inst.C.E. Member of the Berlin Section of the Society of German Engineers.

Part II.—The Gas Plant Fan-Blower.

The great discovery of the compound nature of water gave to engineers the idea that a cheap combustible gas could be produced by the dissociation of steam into its component parts. The mixing of the water-gas so produced with rich hydrocarbons converted the combustible gas into a gas of high illuminating power. The simplest and most effective form of apparatus for the generation of the final carburetted water-gas is known as the "Lowe" plant, where three vertical cylinders are generally placed in series; the generator standing first, and followed in order by a carburettor and superheater. The generator is filled with coke to a depth of about 8 feet; and this mass of coke must first be heated to a condition approaching whiteness before it is ready to produce the dissociation of the steam.

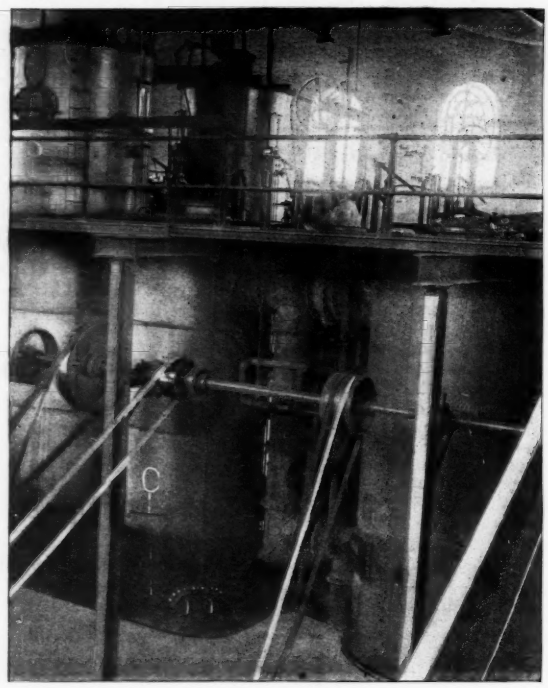


Fig. 7.—Carburetted Water-Gas Plant at the Hornsey Gas-Works.

The fan-blower is the most economical and effective means of rapidly producing the required efficient combustion; and very rarely now are rotary blowers to be seen at work for the forced combustion of gas-producers. Fig. 7 is reproduced from a photograph taken by the writer at the Hornsey Gas-Works. The air supply comes from the fan-room beyond the extreme right of the picture, passing through an 18-inch diameter pipe, below the floor, to the generators, carburettors, and superheaters, which stand in order from right to left. The duplicate plant stands behind; but the two sets are only worked together when a special demand is anticipated.

In order to understand the duties of the fan as applied to the "Lowe" plant, a few words must be written as to the general system of operation. The initial heating of the generator is a more or less lengthy operation; taking about two hours before the mass of coke has reached the required heat. For this purpose, air is introduced at the bottom of the generator below the grate, then passes up through the coke in which the ordinary phases of combustion occur, with the final evolution of carbon monoxide rapidly burning to the dioxide. The coke itself is fed into the generator from the top, and clinkering doors are spaced around the cylinder. An inverted cone below the grate permits the escape of any non-combustible ingredients of the coke. The burning carbon monoxide, evolving great heat, passes into the top of the carburettor, where it generally meets a stream of secondary air from the fan-blowers; the object being to prevent the escape of the unburnt monoxide. The carburettor is honeycombed with fire-bricks, generally so staggered as to offer resistance to the passage of the burning gases, and so brought to a condition of great heat.

The products of combustion—at times still somewhat incomplete—leave the bottom of the carburettor and pass into the bottom of the superheater, where a further stream of air from the fan can be passed in to completely oxidize any of the monoxide which may hitherto have escaped the attention of the atmospheric oxygen. The products of the complete combustion and the inert nitrogen then pass up, and out of, the stack-valve at the top of the superheater, whence they escape into the open air through a metallic chimney. When once the cylinders are at a sufficiently high temperature, the valves admitting air are all closed from the operating platform, and steam is blown through the coke for a "run" of 6 minutes; being dissociated thereby into hydrogen and oxygen. The latter oxidizes the carbon to carbon monoxides, and the mixture passes into the carburettor, where the oil used for the carburetting, previously heated by the waste products of combustion, is added to the non-illuminating water gas. The mixture then enters and rises through the spaces between the hot fire-bricks of the superheater, whence it passes to the purifiers and holder.

Although the fans themselves supply air only during the process of heating or 4 minutes "blow," they are actually running at reduced speed during the "run." When this operation is nearly completed, the operator turns the engine steam-valve on, so that the engine has time to get its speed up before the air-valves are opened. Some idea of the high static resistance to be overcome by the volume of air required for combustion may be formed from the following few words. The air leaving the fans—of which one in general only works at a time—bends to the left, and then has to take a sharp bend to the right before it enters the straight duct between the two sets of plant. An outlet from this leads up to generator bottom, another outlet passes up through a small pipe to the top of the carburettor, and a further quantity of secondary air passes on to the base of superheater. Besides this, the primary air has to be forced through about 8 feet of coke in the generator, and then through the honeycombed carburettor and superheater. The resistance offered to motion by the generator in the present case is approximately 10 inches of water, which was the water-gauge reading obtained at the bottom of the generator, when the fan was running at 1920 revolutions per minute, and one set of apparatus at work. To this must be added the resistance of the ducts and bends—a quantity not at all inconsiderable. Even in a straight, smooth-bore pipe the mere rubbing of the air against the infractuosities of the inside surface will cause a loss of pressure; and consequently this loss must be added to the static resistance of the plant.

A very convenient formula for the loss of pressure due to the passage of air through a duct of smooth internal perimeter is the following, where if

l = length of straight duct in feet
p = perimeter or circumference in feet
v_1 = velocity of air in thousands of feet per minute
b = area of duct in square feet,

the loss of pressure in inches of water is approximately given by

$$0{\cdot}0004 \ \frac{p\, l\, {v_1}^2}{b} \quad (9)$$

where 0·0004 inch is lost per square foot of rubbing surface when the air is moving at 1000 feet a minute. This refers to straight ducts only. A right-angle bend might be considered as equal to forty times its diameter of straight pipe; but an easy bend of large radius, considerably less.

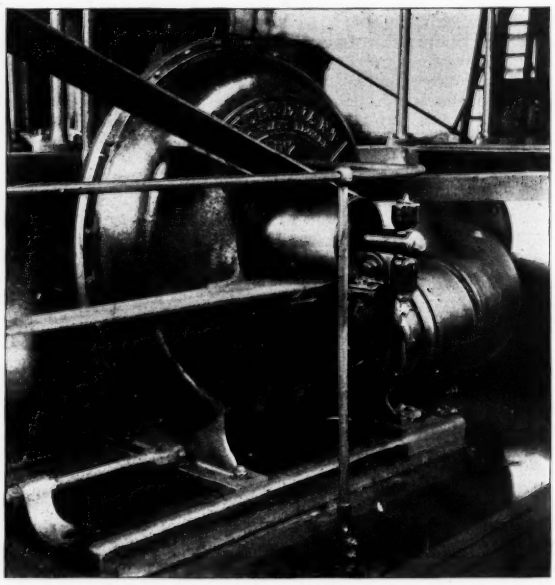


Fig. 8.—No. 7 Gas-Plant Blower at Hornsey.

Fig. 8 shows the No. 7 gas-plant blower at the Hornsey Gas-Works. The dimensions of the wheel inside the casing were shown in fig. 4 (Part I.); the actual diameter of the wheel being 29½ inches; and, as then explained, the orifice of the fan, due to partial blocking of the wheel inlets, amounts to 322 square inches,

although the tip area is as much as 706 square inches. The outlet of the casing is 16 inches diameter; and the air is discharged into an 18-inch diameter main.

It is instructive and interesting to apply a few of the formulæ given in Part I., when the fan-wheel is rotating at 1920 revolutions per minute and the temperature of the air is 70° Fahr. Then the total theoretical pressure is obtained from formula (2) where

$$H_o = \frac{u^2}{g} \frac{\gamma}{\gamma_o} \frac{459 + 32}{459 + t} \quad 12$$

and $u = 247$ feet per second circumferential velocity
$g = 32{\cdot}2$
$\gamma = 0{\cdot}0807$ weight of a cubic foot of air at 32° Fahr.
$\gamma_o = 62{\cdot}3$ " " water "
$t = 70°$ Fahr.

then

$$\frac{\gamma}{\gamma^\circ} \frac{459 + 32}{459 + t} = {\cdot}0012$$

and $H_o = 27{\cdot}2$ inches of water, which is therefore the theoretical total pressure due to a circumferential velocity of 247 feet per second. But the manometric yield from such a fan-wheel (of six radial vanes) being considered as 60 per cent., the total actual pressure due to such a circumferential velocity may be considered as not more than 16 inches of water. This total pressure is used up against a resistance h, and by exerting a dynamic pressure h_1.

By permission of the engineer, the writer tested the fan performance approximately. With the engine running at 320 revolutions per minute, and the fan at 1920 revolutions per minute, and air entering the generator only, the gauge reading was 9 inches. This therefore was the resistance offered to the passage of the air through the three cylinders in series. When, however, secondary air was admitted to the carburettor, the gauge reading rose to 10 inches—indicating the effect of forcing air into the advanced portion of apparatus. The back-pressure caused by the system of ducts connecting the fans to the plant would probably amount to 3·6 in. aq. (approximately calculated from formula 9). The resistance to motion of the air when one set of apparatus is at work is therefore approximately 13·6 inches. Now formula (4) gave

$$h = H \frac{o^2}{a^2 + o^2}$$

but since h is 13·6 and H is 16, the fractional value of the ratio equals 0·85, which, from Table I. (Part I.), gives the ratio of a to o as 0·40, or since o is 322 square inches, a, the equivalent orifice, which would artificially exert a resistance of 13·6 in. aq., is equal to 128 square inches.

Of course, in deciding upon the size of fan for such a plant, two quantities are given—viz., the cubic feet of air to be moved against an approximately estimated back-pressure; thus, from the designer's point of view, the given quantities Q and h must determine the values of a and o, and then u the circumferential velocity.

From formula (7)

$$a = \frac{Q}{0{\cdot}65 \sqrt{2gh \frac{1}{{\cdot}0012} \frac{1}{12}}}$$

And so the value of o, the fan orifice, may be obtained from whatever value of $\frac{a}{o}$ the fan maker thinks fit to work, and therefore the total pressure from formula (4) where

$$h = H \frac{o^2}{a^2 + o^2}$$

and the circumferential velocity from formula (3) where

$$H = k \frac{u^2}{g} \; 0{\cdot}0012 \times 12.$$

It must be borne in mind that h is the total back-pressure against which the volume Q, cubic feet per second, has to be forced.

Testing the performance of a fan is necessarily a different matter; and as in the present case the following are known—viz.,

$o = 322$ square inches $= 2{\cdot}24$ square feet
$h = 13{\cdot}6$ inches of water
$u = 247$ feet per second

Then $a = 128$ square inches $= 0{\cdot}89$ square foot (formula 4) and from formula (6) where

$$Q = 0{\cdot}65 \; a.o.u. \sqrt{\frac{2k}{a^2 + O^2}}$$

the cubic feet of air moved per second is approximately 145. And from formula (8) where

$$P = Q \times 5{\cdot}2 \; H$$

where Q is 145 and H is 16, the foot-pounds per second amount to 12,000, or 21·8 horse-power, which is the theoretical power required to move 145 cubic feet per second by a fan-wheel whose circumferential velocity is 247 feet per second. The mechanical efficiency of such a wheel may be taken as 65 per cent., and is, in fact, higher than that of any other form of wheel, though the manometric yield is not found to be so great as was shown in the case of fig. 1 (Part I.).

The actual brake-horse power, then, absorbed by the fan, at 1920 revolutions per minute, becomes 33·6, which is approximately the actual power given by the 35 brake-horse power steam-engine during the "blow," which result serves to verify the formula used above. During the "run," since the operator has slackened the engine—in this case, to 80 revolutions per minute—the power absorbed to drive the fan at 480 revolutions does not amount to much.

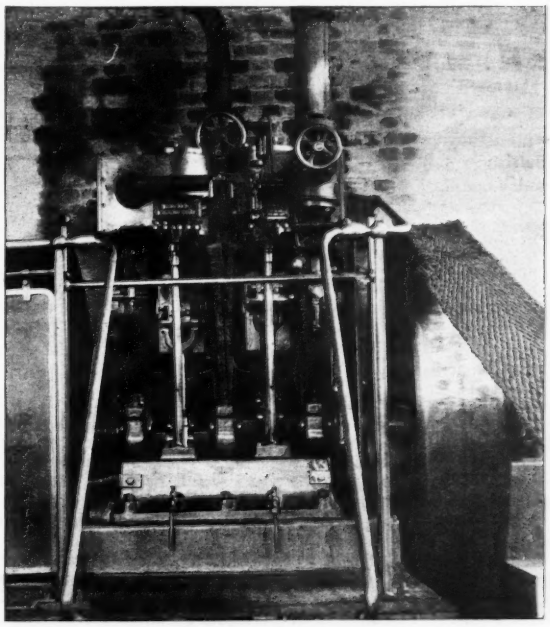


FIG. 9.—DOUBLE UPRIGHT STEAM-ENGINE.

Fig. 9 is from a photograph by the writer of the 35 brake-horse power steam-engine, driving the fan off its 4 ft. 9 in. fly-wheel. The engine has two cylinders, cranks at 180°, and a usual speed of 320 revolutions per minute. The two blowers, each having its engine, are in a sump; the engines driving downwards from the floor level. It is interesting to note that the maximum power taken by the fan would be when running with free 16-inch diameter outlet. The value of a then becomes 1·4 square feet, the area of 16-inch diameter outlet, and the quantity of air moved is from formula (6)—

$$Q = 0{\cdot}65 \times 2{\cdot}24 \times 1{\cdot}4 \times 247 \sqrt{\frac{1{\cdot}20}{2{\cdot}24^2 + 1{\cdot}4^2}}$$

$= 210$ cubic feet per second,

and the power absorbed would be from formula (8)

$P = 210 \times 5{\cdot}2 \times 16 = 17{,}500$ feet lbs. per second,

or an actual brake-horse power of 49. Hence arises a really interesting case; for if the one fan were used to blow the two sets together, the value of a, which for one set was 0·89 square feet, takes the value of 1·4, and consequently 210 cubic feet per second would be moved if 49 brake-horse power were available; if not, the speed of the fan would be decreased to approximately

$$1920 \sqrt[3]{\frac{30}{49}}$$

or (say) to 1650 revolutions per minute. In one form of the "Lowe" apparatus, the superheater stands above an oval carburettor; and in such a case secondary air is only admitted to the bottom of the carburettor. To discuss or point out the merits of this modification is not the purpose of the present article.

In some Continental arrangements of water-gas plant, the waste gases are passed through a regenerator for warming the air supply to the fans. This no doubt gives slight increase of combustion efficiency; but since the power absorbed in moving the air varies as the quantity when the total pressure is constant, it is seen that, to supply a fan with a hot volume must necessarily increase the power required when the same weight of air has to be moved. In Part I., under "power absorbed," it was shown that the power varies as the absolute temperature for the same weights of elastic fluid (either air or gas) handled.

The ninth of the new volumes of the "Encyclopædia Britannica" (the thirty-third of the complete work) has an article on water supply by Mr. G. F. Deacon, M.Inst.C.E. Starting with collecting areas, the author deals in succession with rainfall, evaporation, and absorption. Several pages are devoted to dams, and photogravures are given of those at Lake Vyrnwy, with the construction of which, as is generally known, Mr. Deacon was closely associated. The article closes with some observations on the subject of purification.

TECHNICAL RECORD.

THE RECOVERY OF AMMONIA.

By Dr. F. SCHNIEWIND.

[Extracts from an Article in "Mineral Industry," Vol. X.]

The nitrogen contained in bituminous coal is the most important source of ammonia, and in the near future it will doubtless become the most important source of combined nitrogen. Dr. Knublauch* found the distribution of nitrogen in the products of the dry distillation of two Westphalian coals to be as follows:—

	I. Per Cent.	II. Per Cent.
In coke	30·00	35 60
In gas liquor as ammonia	11 90	14·10
In cyanides	1·80	1·80
In tar	1·30	1·40
As free nitrogen in gas, and rest not determined	55·00	47 10
Total	100·00	100 00
Nitrogen in the coal	1·55	1·479

It is therefore seen that only about 13 per cent. of the total nitrogen in the coal is obtained in the form of ammonia. The Mond producer gas process recovers a part of the large percentage of nitrogen remaining in the coke. The percentage of nitrogen in the coal varies from 0·5 to 2·5, and ordinary coking and gas coals contain from 1·5 to 2 per cent.

A large number of processes have been suggested for increasing the yield of ammonia in the dry distillation of coal, among which the addition of lime to the coal has proved advantageous. Its use, however, is coupled with serious disadvantages which have prevented its adoption in practice.

Gas Liquor.—The amount of gas liquor obtained varies between 7 and 15 per cent., according to the percentage of moisture and water of decomposition, and to the amount of additional scrubbing water used. It does not contain any ammonia in the free state, but is a mixture of various compounds in widely varying percentages. A few of these are decomposed by steam; others only by adding a stronger base than ammonia. The relative proportions of fixed and volatile ammonia vary considerably, according to the character of the coal from which the liquor is derived.

Various Ammonia Products.—The quantity of the various ammonia products consumed in the United States is given elsewhere in this section. Ammonia is shipped from the coke-works generally as ammonium sulphate or concentrated ammoniacal liquor, which forms the basis for the production of the other ammonium compounds. In the United States, gas liquor is generally sold in its crude state.

Ammonium Sulphate.—This is a white salt produced by passing ammonia vapours through sulphuric acid. The commercial article contains between 24 and 25 per cent. of ammonia (NH_3), or from 19·8 to 20·6 per cent. of nitrogen; its purity depends chiefly on the purity of the sulphuric acid used. The coke-oven sulphate is very pure, and is generally sold on a guarantee of 25 per cent. of ammonia. It is very hygroscopic, and consequently has to be stored in dry places. It is usually shipped in bags of 200 lbs. In manufacture, care must be taken that there is no excess of free acid in the salt, which would quickly destroy the bags. It is used chiefly as a fertilizer and as raw material for other ammonia products. Formerly ammonium sulphate was often made by neutralizing the gas liquor with sulphuric acid, and evaporating the weak sulphate solution. This salt was very impure, and contained more or less ammonium sulphocyanide, which is objectionable if the sulphate is used as a fertilizer, because it is poisonous to plants. With the manufacture of ammonium sulphate as now practised—viz., by the distillation of the crude liquor—the presence of this substance is completely avoided.

Concentrated Ammoniacal Liquor.—This is produced by condensing the mixture of steam, ammonia, and gases which are leaving the ammonia still. It is chiefly a solution of ammonium carbonate and ammonium sulphide, and is generally guaranteed to contain a minimum of 15 per cent. of ammonia; but the proportion varies between 15 and 20 per cent. It is shipped in tank cars, and is used chiefly in the manufacture of soda from salt (brine) by the ammonia process. It is also used as a raw material for the manufacture of other ammonia products. Its use for this purpose may increase considerably, because it can be bought cheaper than sulphate on account of the saving of the expense for sulphuric acid. For many years there has been a great scarcity of ammonia in America, which accounts for the slow development of the manufacture of soda; but with the increasing ammonia supply, this industry has rapidly developed. Lunge states that the loss in the manufacture of 100 tons of soda ash is about one ton of ammonia expressed as sulphate. Consequently, the manufacture of 2000 tons of soda ash per day would consume daily the equivalent of 20 tons of ammonium sulphate. We may estimate, therefore, the year's requirements of America in the soda industry as equivalent to about 6000 short tons of sulphate.

Caustic Ammonia or Aqua Ammonia.—This is produced by redistilling the concentrated gas liquor and removing all the impurities (carbonic acid, hydrogen sulphide, tarry constituents, &c.). It is therefore a concentrated solution of pure ammonia. It contains from 20 to 35 per cent. of ammonia. Formerly it was extensively used for refrigerating purposes; but it has recently been replaced to a great extent by liquefied anhydrous ammonia. It is now used in the textile industries for dyeing, for domestic purposes, for electroplating, for chemical purposes, in laboratories, &c. The price varies according to strength and purity. No statistics are available of the quantity of ammonia consumed in this form. It is generally shipped in iron drums of about 1000 lbs. capacity. Considerable quantities of caustic ammonia are used in the manufacture of potassium cyanide by means of recent processes, one of which has been introduced into America, and a very great amount of ammonia is consumed. In Germany, anhydrous ammonia is used instead of caustic ammonia, which is preferable for many reasons; but the present price of anhydrous ammonia makes its employment for this purpose in the United States too costly.

Anhydrous Ammonia.—Ammonia gas is produced commercially, either by the distillation of concentrated ammoniacal liquor (in which case lime and copperas are added in order to retain the carbonic acid and hydrogen sulphide) and subsequent cooling, purifying, and drying of the ammonia gas, or by the decomposition of ammonium sulphate with caustic lime under heat. The ammonia gas is carefully freed from moisture and all impurities, and is then liquefied by compression. It is generally shipped in iron flasks holding about 100 lbs. each. It has been found that anhydrous ammonia manufactured from coke-oven sulphate contains very little of the undesirable pyridine bases. The present price of anhydrous ammonia is about 25 c. per pound f.o.b. ammonia works. The price during 1900 varied from 22 c. to 40 c. per pound (on an average 26·4 c.) according to the distance from the source of supply. It is chiefly used for refrigerating purposes and in the manufacture of artificial ice.

Other Ammonium Compounds.—The following ammonium compounds are of commercial importance: Ammonium chloride (muriate of ammonia), ammonium carbonate, ammonium nitrate, ammonium picrate, ammonium sulphocyanide, and ammonium phosphate. Also, but of minor importance, ammonium chromate, ammonium acetate, and ammonium oxalate.

Sources of Ammonia.—The domestic ammonia production of the United States until recently has been derived almost entirely from coal-gas works, but this supply is becoming entirely inadequate. In recent years bye-products coke-ovens have been adopted, and there are fair prospects of their rapid introduction. This is the only source of domestic ammonia supply which promises a considerable increase. In England, ammonia has also been recovered from Mond gas producers, from the shale oil industry, and from certain blast-furnaces operating on bituminous coals. Small quantities are also obtained in abattoirs and bone charcoal factories. No great increase may be expected from these sources. The largest part of the world's production of ammonium sulphate is used as a fertilizer—a field in which enormous quantities of sodium nitrate are consumed. The addition of the statistical data for the latter may therefore prove of interest. The following table gives the world's production of ammonium sulphate and the exports of sodium nitrate from Chili; the latter being practically identical with the world's production. It shows that the nitrogen equivalent of the sulphate production

World's Production (in Metric Tons) of Ammonium Sulphate and Sodium Nitrate.

—	1898.	1899.	1900.	1901.
Ammonium Sulphate.				
Great Britain	196,500	208,000	210,000	220,000
Germany	100,000	110,000	120,000	130,000
United States	49,000	52,000	58,000	60,000
France	35,000	36,000	37,000	38,000
Belgium, Holland, Sweden, Norway, and Denmark	30,000	32,000	33,000	35,000
Austria, Russia, Spain, and other European Countries	30,000	30,000	35,000	40,000
Total production	440,500	468,000	493,000	523,000
Sodium Nitrate.				
Exports from Chili	1,265,000	1,370,000	1,430,000	1,270,000
Nitrogen equivalent in metric tons of the world's sulphate production	87,220	92,600	97,610	103,550
Do. of Chili's nitrate exports	197,970	214,400	223,800	198,760
Total	285,190	307,000	321,410	302,310
Percentage of sulphate	30·6	30·2	30·3	34·3
Price of 2000 lbs. nitrogen at Liverpool in—				
Sulphate (10,101 lbs.)	$208·80	$248·20	$244·15	$232·50
Nitrate (12,779 lbs.)	191·05	222·10	235·50	249·40

* See "JOURNAL," Vol. LXVI., pp. 1242 and 1294. Similar investigations are published by the late Professor Foster in the "Journal of the Chemical Society," 1883, p. 105, and by Mr. Lewis T. Wright, in the "JOURNAL," Vol. LII., p. 169. In the latter the great influence of temperature is shown.

is only about one-half that of sodium nitrate, and that the production of sulphate has been constantly increasing, even during the period when the price of its nitrogen equivalent was higher than that of nitrate. The progress will no doubt be continued.

Production and Consumption of Ammonium Sulphate and Sodium Nitrate in the United States.—There are no exact figures obtainable; therefore only approximate estimates can be given. These, however, show the limited demand that exists, especially when compared with Germany:—

Estimate of Ammonia Supply and Consumption in the United States for 1901.

	Ammonium Sulphate Equivalent. Short Tons.	
SUPPLY.		
Domestic production—		
Gas-works (crude and concentrated liquor)	12,000	
Coke-works (concentrated liquor and sulphate)	14,150	
Abattoirs and bone-carbonizing plants	2,000	
Total production		28,150
Imports for year ending June 30, 1901—		
Ammonium sulphate	14,486	
Ammonium chloride (4,772,364 lbs.)	2,959	
Ammonium carbonate (181,701 lbs.)	98	
Total imports		17,543
Total supply		45,693
CONSUMPTION.		
Soda-works (concentrated liquor)	6,000	
Refrigeration and ice manufactories (anhydrous and aqua ammonia)	8,000	
Ammonium sulphate fertilizers	16,000	
Ammonium chloride	5,000	
Ammonium carbonate, nitrate, and picrate	1,500	
Aqua ammonia for electro-plating, miscellaneous, chemical, and domestic purposes, balance	9,193	
Total consumption		45,693

Ammonia from Various Works in the United States.—The production of ammonia in gas-works in the United States (equivalent to about 12,000 tons of ammonium sulphate per annum) is increasing but very slightly, owing to the extensive introduction of the water-gas process, in which no ammonia is saved. Coal-gas works only are producing it, and practically all the larger works are now equipped with ammonia stills. The total amount of coal carbonized by gas-works in the United States during 1901 is estimated at 2,100,000 short tons. In the large works, with good practice, ammonia equivalent to 1 per cent. of sulphate is recovered; but in works of moderate size, not more than from 0·6 to 0·8 per cent. of sulphate equivalent is obtained. If an average yield of 0·8 per cent. be assumed, the possible maximum quantity of recoverable ammonia for 1901 would amount to 16,800 short tons of sulphate equivalent. There were recovered 12,000 short tons during 1901, which leaves a waste of 4800 short tons. From these estimates, it may be assumed that no increase in the manufacture of ammonia by gas-works may be expected to an extent which could seriously influence the ammonia market. The annual capacity of all the coke-ovens now building and in operation may be estimated at 50,000 short tons of ammonium sulphate per annum. A limited amount of second-grade ammonium sulphate, having about 19 per cent. of nitrogen, is produced in abattoirs and bone-carbonizing works. Its price is from $2·50 to $3 less than gas liquor ammonium sulphate. The use of bone charcoal in sugar refineries is decreasing, and no increase in the ammonia supply from these sources need be expected.

Imports of Ammonium Salts.—Since the introduction of bye-products coke-ovens, the ammonium sulphate production has been nearly doubled. In the face of this, the price has risen; and the imports, which were 16,822,090 lbs. in 1890, were 28,971,761 lbs. in 1901—an increase of 72 per cent. This is due to its growing demand for refrigerating and fertilizing purposes, and to the inadequacy of the domestic supply. Imports of ammonium chloride (muriate) and ammonium carbonate have been constantly decreasing, as the domestic production can now supply the increase in demand. The imports of gas liquors, which were mostly from Canada, have ceased entirely. The tariff schedule has been responsible for some of the fluctuation in imports—

	M'Kinley Tariff, 1890; per Pound.	Wilson Tariff, 1894; *ad valorem.*	Dingley Tariff, 1897; per Pound.
Ammonium sulphate	0·50 c.	20 p. c.	0·30 c.
Ammonium chloride (muriate)	0·75 ,,	10 ,,	0·75 ,,
Ammonium carbonate	1·75 ,,	20 ,,	1·50 ,,

Prospects of Ammonia Supply.—From the foregoing, it is plain that there is no prospect of any important increase in the ammonia from gas-works and abattoirs. The only chance of increase in domestic supply is from bye-products coke-ovens. The extent to which this may be relied on may be estimated from the total quantity of coke produced in 1901—viz., 20,533,348 short tons. If this were coked in bye-products ovens, about 27,500,000 short tons of coal would be required, which, on an average yield of 1 per cent., would mean only 275,000 short tons of ammonium sulphate. To this may be added 25,000 tons from the gas-works; making a total of 300,000 tons of ammonium sulphate, or 60,000 tons of available nitrogen per year. Germany alone, with but two-thirds the population and smaller agricultural interests, uses 80,000 tons of nitrogen in the form of ammonium sulphate and sodium nitrate for fertilization—a quantity which exceeds by 20,000 tons the present possible capacity of the United States.

Ammonium Sulphate as a Fertilizer.—Plants remove from the soil certain elements which they assimilate, and which are necessary for their growth. By continued removal of crops, certain of these elements are exhausted; and unless they are replaced, the richest soil will in time become exhausted. The three elements that are indispensible to plant growth, and without which, even under favourable conditions and cultivation, no satisfactory crop can be obtained, are nitrogen, potassium, and phosphorus. All commercial fertilizers derive their value from the proportion of these substances contained in available form. Nitrogen is by far the most important and the most expensive. The value of ammonium sulphate as a source of nitrogen is admitted; and the increased crop returns, after the cost of the fertilizer has been deducted, is a matter which has been conclusively demonstrated. In order to encourage agricultural progress in general, and with this the proper use of fertilizers, the United States Government has established agricultural experiment stations throughout the country, particularly in the East and South, where the land has already shown signs of depletion. The outcome of this intelligent propaganda will inevitably enormously increase the demand for ammonium sulphate.

HOFFMANN'S THEORY OF THE SPONTANEOUS IGNITION AND ORIGIN OF COAL.

Brief references have already appeared in the Technical Press to the interesting theory propounded by Dr. J. F. Hoffmann of the mode of formation of coal; but the following further details of a recent communication by him to the "Zeitschrift für angewandte Chemie" are suggestive.

He first of all reports his experiments on the spontaneous ignition of bran. When bran was heated to 130° C., it rapidly heated up further of its own accord, until it carbonized, and, in a strong current of air, burned brightly. According to Dr. Hoffmann, this heating up takes place without the co-operation of the air. The decomposition of carbohydrates into carbon and water can supply theoretically a not inconsiderable amount of heat; and this well-known fact is exhaustively discussed in connection with the observations on bran. The phenomena are very similar in the case of coal, as has often been pointed out. But the same explanation does not hold good here, because the energy of the coal, and of the products of its decomposition by heat, is the same. At ordinary temperatures, the spontaneous ignition of bran, corn, and other vegetable substances is initiated by dampness, which favours the activity of bacteria and the setting up of a process of fermentation, such as occurs in new hay. After the organisms have been killed by the heat, the process passes on to spontaneous ignition. Possibly the passage from the biological to the purely chemical process is effected by the ferments produced by the organisms. Starch proved to be indifferent, as compared with bran, probably owing to its deficiency in nitrogen, which implies an absence of ferments. The ignition of other substances, such as vegetable fibres dipped in linseed oil, and coal, takes place, of course, without the co-operation of organisms. A case of the carbonization of corn in a freshly built, and still damp, silo building is referred to.

Dr. Hoffmann is of opinion that both coal and lignite originated in this manner. As evidence, he cites the fact that lignitic coals of great age are known, as well as mine workings in which conversion into lignite-like substances has occurred; therefore time alone cannot be the determining factor. Proof of the conversion of cellulose into carbon and water at ordinary temperatures is still wanting; and in spite of the development of heat which might occur, it is unlikely to be afforded.

Herr A. Bauer points out, in the "Journal für Gasbeleuchtung," that Dr. Hoffmann has omitted to notice that mineral coal is by no means identical with the products of carbonization by heat or with pure carbon; while he makes the singular hypothesis that, from water and carbon in the course of formation, there are formed, by secondary action, organic compounds of various kinds. In Herr Bauer's opinion, the question of the formation of coal has not been further elucidated by the experiments of Dr. Hoffmann on the spontaneous ignition of coal and other organic substances.

EFFECT OF PRESSURE OF GAS ON LUMINOSITY.

Results of Mr. Holgate's Experiments.

It may be remembered that in the course of his Inaugural Address to the Institution of Gas Engineers, at their meeting in May last year, the President (Mr. Thomas Holgate, M.Inst.C.E., of Halifax) gave, in an appendix, the results of a number of tests made by him with high and low grade gas. Reference was also made to other tests, which he had tabulated in a second appendix. As this had not been completed at the time of the meeting,

Mr. Holgate kindly promised that it should be prepared for subsequent publication in our columns. We have now received it, and give it below.

APPENDIX B.—EFFECT OF PRESSURE OF GAS ON LUMINOSITY.
Tests of No. 4 Kern Burner with Welsbach Mantle.

Date of Test.	Pressure of Gas.		Cubic Feet of Gas per Hour.	Illuminating Power.	
	At Inlet of Governor.	At Outlet of Governor.		In Candles.	Per C. Ft. per Hour.
Jan. 22, 1902.	0 90	Without governor.	3·77	70·4	18·70
	1·45		4·69	86·8	18·50
	1·50		5·17	94·5	18·30
	2 10		6·32	104·9	16·60
Average of four tests	1·49	..	4 99	89 15	18·02
	1·05	With Peebles needle governor.	3·08	59·4	19·30
	1·65		4·41	104·9	23 80
	1·95		4·51	112·4	24 92
	2·56		5·22	118·4	22·71
	2 90		5·00	112 4	22·48
Average of five tests	2·022	..	4·444	101·5	22 64
	0·99	With Peebles disc governor.	2·705	59·5	21·90
	1·18		2 910	68·4	23 50
	1·44		3 410	113·2	33·30
	1·44		3·450	113·2	32 90
	1·60		3·745	106·5	28 50
	2 01		3·710	105·7	28·50
	2·45		4·320	123 8	28·70
	2 95		4·290	123 8	28·90
	3·53		4·350	121·1	27·90
Average of nine tests	1·955	..	3·654	103 9	28·23
Jan. 29, 1902.	2·05	1·05	4·17	110·0	26·40
	2·52	1·01	4·00	119·3	29·84
	2·92	1·00	4·11	121·0	29·54
	3·58	0·98	4·08	125·6	30·70
	4·00	0·94	4·11	125·6	30·60
Average of five tests.	3·014	0·996	4·094	120·3	29·42
Feb. 7, 1902.	0·58	0·465	2·700	84·0	31·1
	0·65	0·530	2·830	99·0	35·0
	0·75	0·650	3·000	111·0	37·0
	0·80	0·660	3·160	113·2	35·9
	0·82	0·665	3·175	115·8	36·5
	0·85	0·690	3·170	115·8	36·6
	0·85	0·695	3·300	115·8	35·1
	0·88	0·695	3·073	115·8	37·4
	1·10	0·890	3·700	117·5	31·8
Average of nine tests	0·809	0·660	3·1253	109·76	35·155
Feb. 8, 1902.	1·11	0·56	2·91	110·0	37·8
	1·13	0·56	2·97	112·0	37·7
	1·15	0·59	2·98	112·5	37·8
	1·15	0·60	2·95	111·0	37·7
	1·17	0·57	2·97	112·5	37·9
	1·21	0·60	3·04	115·0	37·8
	1·21	0·61	3·03	118·0	39·0
	1·25	0·64	3·19	130·0	40·7
	1·29	0·65	3·16	130·0	41·2
	1·32	0·67	3·24	130 0	40·1
	1·34	0·68	3·17	130·0	41·0
	1·40	0·71	3 33	130·0	39·1
	1·64	0·74	4·22	130 0	30·4
Average of 13 tests .	1·259	0·629	3·166	120·85	38·323
March 17, 1902.	1·5	0·60	2·83	142	50·2
	1·8	0·60	2·75	154	56·0
	2·1	0·60	2·83	137	48·6
	2 8	0·60	2 78	137	49·3
	3·7	0·60	2·74	165	60·3
Average of five tests	2·38	0·60	2·786	147	52·88
April 2, 1902.	4·0	0·54	2·75	151	54·9
	3·5	0·54	2·75	151	54·9
	3·0	0·54	2 77	151	54·5
	2·5	0·54	2·75	151	54·9
	2·0	0·54	2·43	169	69·7
	1·5	0·54	2·43	169	69·7
	1·0	0 50	2·43	169	69·7
	0·9	0·50	2 30	134	58·1
	0·7	0·40	2·12	99	49·1
Average of nine tests	2·12	0·515	2·515	149·3	59·5

In a note to the tables Mr. Holgate says: "These tests were made upon a Referees' table photometer, fitted with Harcourt's 10-candle pentane standard; and the readings were observed by Mr. J. F. Smith, the Chemist at the Halifax Gas-Works, assisted by Messrs. W. N. Booth and Joshua Pyrah. The difficulty of comparing upon the photoped the different coloured lights was recognized; and, in order to check the figures given in this appendix, further tests have been made with two observers. These latter results confirm the former. The writer has been in communication with the maker of an instrument designed to overcome the disparity of colour in lights, but up to the present [Jan. 28, 1903] has not been able to procure the same. He hopes to be able to repeat the tests, using a bar photometer fitted with a star disc. The gas used in the tests was of 18-candle power, made from coal and cannel."

THE PROGRESS OF THE RECOVERY COKE-OVEN IN GERMANY.

The following digest of a recent article in the "Zeitschrift für Beleuchtungswesen" supplements the valuable paper of Herr Hilgenstock, given in the "JOURNAL" for Oct. 28 last (p. 1145), on "German Coke-Oven Practice," and at the same time affords an interesting revelation of the present trend of affairs in Germany in regard to the manufacture and importation of tar and ammonia products.

German coals cannot be used for the production of iron in blast-furnaces, on account of the nitrogen and hydrogen which they contain. At a high temperature they evolve gases, and would either explode or swell, and in any case would block up the shaft, so that the blast would meet with great resistance. The gases developed, since they would be given off in the upper part of the furnace where a low temperature prevails, would be also lost so far as the reduction of the ore was concerned, and thus valuable constituents of the coal would go unutilized. Anthracite is used for blast-furnaces in England and America; but in Germany a product of equal value has first to be produced by dry distillation of coals, which are usually very impure. The gas coke obtained as a bye-product in the manufacture of illuminating gas is not suitable for foundry purposes, and would, moreover, not be able to cope with the demand. It has therefore been the practice to make coke from coal by working so as to obtain a specially good product. The gas evolved is used for firing the retorts; and the other bye-products are also recovered. By regulating the temperature, it is possible to obtain from the same coal much gas and inferior coke, or little gas and valuable coke.

Ovens shaped like blast-furnaces were used at first; but the yield from them was somewhat low. The greatest progress in the construction of coke-ovens has been made by the firm of Dr. C. Otto and Co., of Dahlhausen, who first undertook the recovery of bye-products, and employed the Siemens regenerative system for firing. Later, however, it appeared from the work of the General Manager, Herr Hilgenstock, that the regenerator plant is superfluous and causes unnecessary complications. His new type of oven gives a yield nearly four times that obtained from those in use twenty years ago; while the coke produced is at the same time better. In Germany, some 14,000 of these ovens are already in use; and they are beginning to be employed in England and America. The ovens, as already described in the "JOURNAL," are walled chambers 33 feet long, 6 ft. 6 in. high and 1 ft. 8 in. wide. This small width renders possible an extremely regular distribution of the heat; thus helping to form a thoroughly good coke. The products of distillation escape from the chamber through outlet pipes into a main-pipe, and are then drawn by exhausters into condensers and washers, where the tar and ammonia are separated.

The gas itself is carried through a pipe beneath the arch of the oven, and then through branch pipes to the various bunsen burners. The combustion of the gas in bunsen burners has proved to be particularly suitable, as a flame easily regulated is obtained. The bunsen burners draw the air required for combustion out of the arch, where it has been previously heated to 400° C. Regeneration of heat is thus in a certain measure secured, and the brickwork is kept constantly cool. The flames first pass up into the bottom passages, then play round the side walls of the chambers, and flow through the upper passages above the chambers and over the fire-bridge downwards into the conduits, beneath the chambers, and thence into the flue. Valves are inserted in the pipes leading to the flue. The heat which the combustion gases possess on entering the flue, is still further utilized for heating water for the boilers, or for drying processes; and only after such use do the gases pass into the chimney. Thus the waste heat is not lost, while the regenerative system is avoided. The highest temperature prevails in the lower horizontal bottom passages, where 1380° to 1460° C has been measured. In the vertical passages up which the flames rise, there is a temperature of 1245° C., and in the upper part of the chambers 1200°. Thus the products distilled off pass up into cooler zones, and do not undergo any decomposition. So that, on the one hand, the coke does not deteriorate, and, on the other hand, the yield of the valuable constituents of the tar is greater.

It has already been pointed out that, in consequence of the high temperature, the yield of coke, in comparison with the formation of lighter hydrocarbons, is particularly favourable; some 15 per cent. more coke is obtained than with the old construction of oven, and the gas contains extremely little nitrogen. By

dispensing with regenerators, the way for the flames and the gases of combustion is shorter, and a smaller chimney draught is required for working. The ovens are charged from above, and the coke is pressed out at the side, for which purpose mechanical arrangements are fitted on one side of the oven. An oven yields 32 tons of metallurgical coke in a week. This is, as already mentioned, better than gas coke, and differs considerably from it in appearance. It is not dark grey, but bright grey to silver white, has a metallic sheen, and an extremely dense structure. The tar, moreover, is particularly rich in benzene hydrocarbons. Through the recovery of the bye-products in coke-ovens, the German colour industry has in recent years become independent of abroad; whereas formerly, when the production of the German gas-works did not suffice, benzene and anthracene were obtained from England. For the fertilizer trade also, the new processes will in time become of great importance. The ammoniacal liquor is converted into sulphate of ammonia, which is a valuable nitrogenous manure, and a substitute for the expensive nitrate of soda.

Since the general adoption of the Otto-Hilgenstock ovens, the yearly production of ammonium sulphate in Germany has steadily increased. In 1895, for example, it amounted in Westphalia to 10,000 tons, but had increased to 50,000 tons in 1900; while the price had remained nearly constant. It cannot, therefore, be assumed that, owing to the increase of coke-ovens, there will follow an over production of sulphate of ammonia, and a consequent fall in price. Comparing the price of this product with that recently paid for nitrate of soda, it is found that the figures nearly agree. Ammonium sulphate is the best substitute for nitrate; and it must be remembered that it contains 5 per cent. more nitrogen. As the exhaustion of the nitrate beds in Chili is within measurable distance of consummation, it is a special advantage to Germany of this system of coking that it provides a perfect substitute for nitrate, and at the same time renders German agriculture independent of foreign ammonium sulphate.

THE DETERMINATION OF PRUSSIAN BLUE IN SPENT OXIDE.

Following on the recent investigation of methods of determining prussian blue in spent oxide by Herren Bernheimer and Schiff, of which an account has been given in the "JOURNAL" (*ante*, p. 290), a later number of the "Chemiker Zeitung" contains a paper by Dr. Lührig, who has made an exhaustive study of the same question. The following is an abstract-translation of the paper.

The researches described were undertaken in order to decide whether (1) titration with copper sulphate, or (2) determination of the iron either in the caustic alkali solution of the ferrocyanide or in the prussian blue precipitated by means of ferric chloride from that solution, or (3) the estimation of the percentage of nitrogen in the prussian blue, furnished the most correct results. These different methods gave correct results when the pure salts were analyzed. There were added to 10 grammes of powdered and clean bog iron ore, in a 250 c.c. flask, 1 gramme of potassium ferrocyanide and 50 c.c. of 10 per cent. solution of caustic potash. After standing for several hours, the flask was filled up to the mark, 4 c.c. of water were added as a correction for the volume occupied by the solid matter, and it was then well shaken and filtered. In each 50 c.c. of the filtrate, corresponding to 0·2 gramme of potassium ferrocyanide, the proportion of the latter was ascertained in the following manner:—

1.—By evaporation with sulphuric acid in a platinum basin, igniting, taking up the residue with sulphuric acid, and titrating the iron, after reduction by pure zinc, with potassium permanganate. Result, 0·2009 gramme.

2.—By precipitation with ferric chloride, after removal of any traces of alumina by evaporation of the alkaline solution with ammonium sulphate until the disappearance of the smell of ammonia. The prussian blue obtained was ignited, and the resultant ferric oxide was weighed. Result, 0·2013 gramme.

3.—By precipitation with ferric chloride as prussian blue, decomposing the latter with a hot solution of caustic soda, and determining the iron (*a*) in the residue [$Fe(OH)_3$] by titration; (*b*) in the filtrate (sodium ferrocyanide) after evaporation with sulphuric acid, igniting, reducing with zinc, and titrating with potassium permanganate. Results: (*a*) 0·2004 gramme; (*b*) 0·2011 gramme.

4.—By determination of the percentage of nitrogen in the precipitated prussian blue. Result, 0·1990 gramme.

Another 10 grammes of bog iron ore were treated alone with solution of caustic potash, and soluble iron compounds were not given up by it. The percentage of blue in samples of spent oxide was determined by accurately following Knublauch's method. Then, in 100 c.c. of the original solution of a sample which gave 7·74 per cent. by Knublauch's method, the percentage of iron was ascertained: (1) By evaporation with sulphuric acid, reduction with zinc, and titration with potassium permanganate; (2) by precipitation of the blue in the ferrocyanide solution, and then proceeding in the same manner. The results were: (1) 8·40 per cent.; (2) 7·87 per cent. Here, therefore, the latter result agrees with the Knublauch method. Further experiments showed—

According to Knublauch's method	7·59 per cent. ..	7·53 per cent.
,, ,, Method (1) . . .	8·33 ,, ,, ..	8·21 ,, ,,

Determining the proportion of iron in the solution obtained by decomposing the prussian blue with solution of caustic potash furnished the same results as determining the proportion of iron in the separated ferric hydrate. Thus:

By Knublauch's method	Mean . .	7·22 per cent.
By precipitation of the blue and:	(1) Iron in the filtrate	8·07 ,, ,,
,, ,, ,,	(2) Iron of the Fe $(OH)_3$	8·17 ,, ,,

Another spent oxide, however, gave the following values:—

According to Knublauch's method . . .	6·74 per cent. ..	6·81 per cent.
By precipitation of the blue and: (1) Iron in the filtrate	8·20 ,, ,, ..	8·22 ,, ,,
By precipitation of the blue and: (2) Iron of the Fe $(OH)_3$	8·71 ,, ,, ..	8·91 ,, ,,

The author supposes that in this spent oxide there were other compounds readily precipitated by ferric chloride. These would be again decomposed on treatment with solution of caustic potash, and the iron would be, according to the nature of the compound, separated in either an insoluble or a soluble form. Hence the different results. Further experiments proved the purity of the Fe $(OH)_3$ remaining on the filter after decomposing the blue by solution of caustic potash; thus:—

According to Knublauch's method . . .	per cent.	7·24 .. 7·27 ..	7·26
After precipitation:			
(1)—From the Fe (OH_3) by burning off the filter and igniting the residue . .	,, ,,	9·01 .. 9·39 ..	9·20
(2)—From the residue, by dissolving, reducing, and titrating the iron by potassium permanganate . . .	,, ,,	8·94 .. 9·30 ..	9·11

Besides the methods hitherto employed, one based on the determination of the iron in the prussian blue was also tried. For this purpose, an alkaline extract, made according to Knublauch's procedure, was boiled with ammonium sulphate until the smell of ammonia had disappeared. By this means, alumina was separated. After cooling, it was made up to a certain volume, and the blue was precipitated in an aliquot portion. The precipitate was converted into ash and ignited. The results were:—

(1) According to Knublauch's method . .	Mean . . .	7·31 per cent.
(2) Gravimetric determination of the Fe_2O_3		9·12 ,, ,,
(2a) Titration of the iron in the ignited residue		8·70 ,, ,,
(3) By precipitation of the blue and		
(a) titrating the iron of the Fe $(OH)_3$ . . .	Mean	8·86 ,, ,,
(b) ,, ,, ,, ,,	R_4 Fe $(CN)_6$ in the filtrate .	8·61 ,, ,,

Here also Knublauch's method gave considerably lower values. By a series of experiments, the author shows that the methods based on the determination of the iron, both in the prussian blue itself and in the potassium ferrocyanide and ferric hydrate produced by decomposition of the blue with solution of caustic potash, give nearly the same values. That the Knublauch method gives considerably lower values, is evidently due, as observed by Bernheimer and Schiff (*ante*, p. 290) to the fact that, on testing the Knublauch filtrate from the copper precipitation with ferric chloride, precipitable compounds escape conversion by the copper sulphate.

Lastly, Dr. Lührig compares the result of determinations of blue made according to the Knublauch and Nauss method. The Nauss titration gave considerably higher values than the Knublauch titration, but approximately agreed with the determinations of the iron after decomposition of the blue with solution of caustic potash, by titration of the potassium ferrocyanide formed.

London and Southern District Junior Gas Association.—We are asked by the Hon. Secretary and Treasurer of the Association (Mr. P. F. Scarth) to notify that a general meeting of the Association will be held at the Polytechnic Institute, Regent Street, on Friday next, at 8 p.m., for the purpose of reporting the progress made and submitting the proposed rules to the members. Anyone interested in the Association is invited to be present.

Transactions of the Gas Institute.—After some delay, owing to circumstances which will be readily understood, the "Transactions" of the Gas Institute for the past year have been issued. In view of the prospective amalgamation with the Institution, it was deemed advisable to include in the volume reports which appeared in the "JOURNAL" of the proceedings at the meetings held on the 1st and 29th of November at which the union was sanctioned; and these, with the Memorandum and Articles of Association, follow lists of members. Of the technical matter, it is only necessary to say that it consists of the papers read, and the lecture delivered, at the meeting held at Southampton last June, under the presidency of Mr. S. Westall Durkin, Manager of the Southampton Gas Company; and it is amply illustrated by folding plates. The useful subject-index has been brought up to date; and the whole of the matter arranged under the editorship of the Secretary (Mr. Walter T. Dunn). Special interest attaches to the volume, inasmuch as it contains a record of the last year's work of the Institute as a separate body; and it may be safely averred that it will bear comparison with those which have preceded it.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Tottenham Gas Company's Holders.

SIR,—The notice which appeared in the "JOURNAL" for the 6th ult., relating to the Tottenham and Edmonton Gas Company—accompanied as it was by a picture of the range of holders erected at the Company's works—displayed in a very interesting manner the considerable progress which this Suburban Gas Company has made. This development, striking as it is, may, however, I think, be displayed even more conspicuously if you will allow me to relate a little more about the Company's gasholders which my long personal acquaintance with the Company enables me to do.

It was in the year 1858 that my late father erected for the Company a single-lift holder (and which was about the first holder with the construction of which I had anything practically to do). It was 80 feet in diameter and 20 feet deep, and was considered then an important addition to the Company's plant. This holder was removed in 1869, and replaced by a two-lift telescopic holder. It is not shown on the photograph, but is still doing work for the Company as a relief holder in connection with the water-gas plant.

The holder which is most distant in the picture view was also originally erected by my firm in the year 1865, as a single-lift one—viz., 100 feet in diameter by 24 feet; and it also, in like manner, was taken out in 1877 and substituted by a telescopic two-lift holder, as now illustrated by the picture.

In the early days, when the first holder was erected, Mr. David Barclay was the Engineer and Mr. W. Black the Chairman of the Company. Many changes have taken place since then; but throughout them all the genial gentleman, Mr. James Randall, has remained and continues the Secretary of the Company.

SAM. CUTLER.

Millwall, E., Feb. 4, 1903.

Clip for Meter Unions.

SIR,—Practically the clip I have had in use for many years is the same as that patented by Mr. Bridden. If, however, any of your readers are in doubt, I shall be glad to let them see one I use, which they can compare with Mr. Bridden's.

If Mr. Bridden had followed the suggestion I made to him many months ago, before, I believe, he had completed his patent or had consulted his patent agent, he would have found that the mere fact that his is made in tin instead of in brass, and is secured with "a drop of wax," instead of a lead seal or a lock, would not have entitled him to a patent, even though my clip may not be known outside Preston.

HENRY GREEN.

Preston, Feb. 5, 1903.

The Trend of Invention and the Manufacture of Cyanide.

SIR,—In your issue of the 27th ult., you published an interesting article on the trend of invention in connection with the gas industry of 1902; the result of your analysis being eminently satisfactory to this country. In MM. Robine and Lenglen's paper on "The Gas Industry and the Manufacture of Cyanides" (an abstract translation of which appeared in the "JOURNAL" issued last month), an opportunity is afforded of applying your analytical method to what must be called a French summary of notable inventions in this department of the industry. Out of 25 inventors quoted by these authors, 15 are apparently German, 8 British, and 2 French. But British patents, as is well known, are often taken out in the name of some inhabitant of Germany, and any such would, of course, go to reduce the German preponderance. And it thus happens that a patent of my own for manufacturing cyanides, and which I have since superseded, is included in their list as that of P. Mascow's of 1901—and to which the French authors call attention (*ante*, p. 224) There may possibly be more such; but MM. Robine and Lenglen's list shows 14 German, 9 British, and 2 French patents in this department of the gas industry—which is not so satisfactory as you have shown the others to be.

GEORGE CRAIG, F.I.C.

Glasgow, Feb. 3, 1903.

LEGAL INTELLIGENCE.

Claim for Damage Caused by Flooding.

At the Southwark County Court last Thursday, Judge Addison, K.C., decided an important case as to the liability of water companies to pay compensation for damage caused by the flooding of premises as the result of defective pipes. The plaintiffs were the Civil Service Supply Association, and they sued the Southwark and Vauxhall Water Company to recover £18 odd for damage caused through the alleged negligence of their servants. Mr. Morton Smith appeared for the plaintiffs; Mr. Glasgow represented the defendants. Mr. Smith, in opening the case, said the plaintiffs had large wine cellars underneath the Waterloo Road. The Company's pipes ran underneath the footway, and six years ago the cellars were flooded. The defendants took out the faulty pipe, and four years ago the whole of the line of mains was exposed, so that the Company could see their condition. They found that several of them were not in good order, and they were repaired. On the 22nd of September, the plaintiffs' cellars were flooded; and when the water-pipe was taken out, it was found to have three large holes in it. The alleged negligence of the Company lay in the fact that they had had an opportunity of seeing that the pipes were wearing out, and they failed to remedy the defects. Mr. D. F. Worger, Assistant-Engineer to the Company, said that four years ago the pipe was in perfect condition, and the crack which caused the flooding must have resulted from contraction. In September there was a week of very keen east wind, and that would lower the temperature of the water passing through the pipe, which was 30 years old; but this was not a very great age for a water-pipe. Mr. Glasgow submitted that the defendants had shown that the flooding arose from a common accident which no skill could prevent, and therefore they were absolved from blame. His Honour said he could not say that the plaintiffs had made out any negligence against the Company; and therefore he was driven, but with great reluctance, to find for the defendants, with costs. Judgment was entered accordingly.

Claim for Removing a Gas-Cooker.

Before the Isle of Wight County Bench last Saturday week, Mr. G. M. Burne was summoned by the Cowes Urban District Council for 1s. 11d., the cost of disconnecting and removing a gas-cooker. Mr. W. Halliday, the Secretary to the Gas Department, said the defendant had a gas-cooker on the hire purchase system; and on giving up the house, he asked that it should be removed and warehoused. The Chairman remarked that, as this was a municipal trading case, he thought it was one for the County Court. Mr. Hiscock, who appeared for the defendant, said that was his contention. In cross-examining Mr. Halliday, Mr. Hiscock put in some circulars, with a view of showing that the Council agreed to fit and remove cookers free of cost. Mr. Halliday replied that these conditions did not apply to defendant's case, as he had his stove on the hire-purchase system long before the circulars were issued. The Chairman (looking at the circulars) asked if so pretty a piece of printing was done at the expense of the ratepayers. Mr. Halliday answered that the circulars were issued by the Council, but the makers of the stoves paid for them. Mr. Hiscock contended that section 40 of the Gas-Works Clauses Act, 1847, under which the proceedings were taken, did not apply. The case was one for the County Court, as his client would then have an opportunity of raising a counter-claim, which he could not do in that Court. He claimed to be entitled to a rebate on the cooker, having returned it within twelve months, and paid for it on the hire-purchase system. Defendant had paid £10 for the gas consumed, and other charges, with the exception of the amount in question; and he was only contesting the point in the interest of the public, to show that a gas undertaking could not come before the Magistrates with such a claim. The Chairman said the Bench were of opinion that they had no jurisdiction in the matter, and the summons would be dismissed. On the application of Mr. Hiscock, they allowed the defendant one guinea expenses.

Concession to Large Gas Consumers at Loughborough.—On the recommendation of the Gas Charges Sub Committee, who were instructed to consider and report upon the question of granting more favourable terms to exceptionally large consumers of gas, the Loughborough Town Council have decided that the prices shall be as follows: Under 100,000 cubic feet per quarter, 3s. 4d. per 1000 cubic feet; 100,000 and under 500,000 feet, 3s. 2d.; 500,000 feet and upwards, 3s. 1d. The revised charges are to take effect as from the commencement of the current quarter.

An Object-Lesson to Grumblers at Leicester.—It may be remembered that we gave in the "JOURNAL" a fortnight ago an account of an interview with Mr. Alfred Colson, of Leicester, by a representative of a local paper, on the subject of the quality of the gas supplied to the town. Mr. Colson showed his visitor that it rested entirely with the consumers whether they had good or bad lighting, as this depended solely upon the burner used. This has just been demonstrated through the agency of one of the Gas Committee of the Corporation. The gentleman in question is a member of the local branch of the Amalgamated Society of Engineers, in the club-room of which he has had for some time to bear the taunts and the sarcasm of his fellow-members on the subject of the "wretched gas." He communicated with Mr. Colson, who soon made a change. The room was lighted (after a fashion) by ten ordinary gas-jets, consuming 60 cubic feet per hour, and giving the light of 50 candles, at a cost of 1¾d. per hour. He substituted six No. 3 Kern burners, which give the light of 420 candles, at a cost of 1d. less—viz., ¾d.—per hour. This is an object-lesson which others in the town will do well to profit by.

New Joint-Stock Companies.—The Dynamic Gas Power Company, Limited, has been registered, with a capital of £155,000 in £1 shares, to acquire any patents, &c., relating to the production, treatment, storage, application, distribution, and use of coal or other gas and apparatus therefor; to adopt an agreement with F. E. Bowman, T. H. Oswald, and the Widnes Foundry Company; to manufacture and deal in stoves, engines, and other apparatus, for working or exploiting such patents or inventions, for use in connection with gas-engines or motive power generally; and to carry on the business of mechanical engineers, gas and water supply engineers, coal merchants, producers and suppliers of gas, coke, tar, pitch, asphalte, ammoniacal liquors, and other residual products obtained in the manufacture of coal gas; as manufacturers of meters, pipes, fittings, and machinery, colliery proprietors, miners, mineral and metal workers and merchants, &c. The Beech Acetylene Gas Company, Limited, with a capital of £1500 in £1 shares, will acquire from W. W. Beech and H. Jones, for £500, a sole licence, under patent No. 24,409 of 1898, relating to improvements in apparatus, for generating and storing acetylene and other gas and the like, and to carry on the business of gas and mechanical engineers, &c. The Lamp Manufacturing Company, Limited, has been registered, with a capital of £10,000 in £1 shares, to take over the business of a Company of the same name (incorporated in 1895, and now in liquidation); to manufacture and deal in lamps and lighting and heating appliances of all kinds; and to carry on business as mechanical, electrical, gas, and lighting engineers, &c.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held last Friday, at the Offices, Horseferry Road, Westminster—Colonel Sir W. T. MAKINS, Bart. (the Governor), in the chair.

The SECRETARY and GENERAL MANAGER (Mr. J. W. Field) read the notice convening the meeting; and the seal of the Company was affixed to the Register of Proprietors. The report and accounts (which have already appeared in the "JOURNAL") were taken as read.

The GOVERNOR: Ladies and gentlemen, there are only three of seven paragraphs of the report which have direct reference to the Com pany's business in the past half year. They do not, I think, call for anything in the way of prolonged comment, and as we have important questions to consider at the Wharncliffe meeting to be held immediately after the close of this meeting, I will proceed at once to offer a few remarks on the accounts which are before us. First, with regard to the second paragraph, which tells you that the last half of the year, as did the first, shows a small falling off in the sales of gas—a fraction less than ½ per cent.—you will remember that the reduction in the June half-year's sales was three-fourths of 1 per cent. The reduction therefore over the whole year has been six-tenths of 1 per cent. In money, the reduction in rentals for the whole year was £405,480, of which £385,000 represents reduction in price and £20,500 reduction in sales. This fact is noteworthy in a year when the remission of price amounted to nearly £400,000. Even with the great reduction in price, there was this fractional reduction in sales. That, I think you will recollect, is a repetition of what has occurred previously in the history of this Company—a reduction in price is not always followed by an increase in sales. With regard to the causes, I need not remind you that, having a district which is extensively lighted—perhaps more extensively than any other district in the world—by means of electricity, we are especially dependent upon weather conditions for an extension of the sale of gas. So large a proportion of the gas supplied is required for heating purposes, that the abnormally high temperatures such as those which prevailed during the months of November and December last, checked the demand. I regret to say that the same high temperature still prevailed in the month of January. A reduced demand for gas during the closing months of the year is, of course, far more serious than at other periods, and affects prejudicially the accounts for the whole of the year. I am told that the experience of other companies has been similar to ours. They do not, because of their different and expansive districts, show an equal reduction; but they do show a decreased increase, or a lower rate of increase than is usual with them. You will see there is a satisfactory increase in the stove rentals; and I want to say a few words on the subject of the late fatal accidents which have been caused by the use—or rather misuse—of gas-stoves. There is no better system of warming a room or office, especially when the use of the room is intermittent, than that of gas-fires; and there is no better or more economical system of cooking than by gas-cookers. But gas-stoves, for whatever purpose used, can only be successful when intelligence and care have been exercised in fixing them with regard to the important question of ventilation. Equal intelligence and care are required in the use of them. To shut one's self up with a gas-stove, or a bath-heater, in a room having no efficient provision for the ingress of fresh air, as well as to carry off the products of combustion, is to court fatality. There is another matter to which I would call attention, and that is the necessity that exists for gas-stoves of every description, but especially cooking-stoves, to be kept clean. It is the neglect of this elementary duty on the part of the consumers that causes the disappointment and annoyance which we hear of from time to time. I know the objection which exists on the part of English householders to what they deem officious interference on the part of gas or water companies. I had before me this week a protest from a consumer against a very harmless inquiry made by one of our employees, which he describes as "an impertinence." It is this objection which stands in the way of what would be in many respects a desirable system—that is, the periodical examination by the Company's representatives of consumers' fittings and stoves. But I would urge on our consumers to avail themselves freely of the Company's officers whenever advice or assistance is needed in connection with the supply of gas. A post-card or telephone message, sent either here or to any branch office, will secure prompt attention to any difficulty or temporary failure in the supply. In connection with this, I may say our new mantle maintenance department, which undertakes the periodical examination of incandescent gas-mantles and their maintenance, is doing good work. We do not look for direct profit from this branch of business. The system has enabled us to get into closer touch with the consumers; and owing to the tact and intelligence shown by the Company's officers engaged in this particular work, we have recovered several large and important customers who had the electric light on their premises. It is in this direction that the Company will permanently profit by the new departure. It is, moreover, very satisfactory to find that we are evidently by this means supplying a public want. The Court have had put before them figures which show (and I am putting it in a very mild form) that the ultimate success of the mantle department is secured. Now, to return to the accounts. The price of residuals has been well maintained. You will remember that during a part of the December half of 1901 we were obtaining comparatively high prices for coke, whereas the rates during the past six months have been normal. A reduction of £20,000 in our residuals income is, however, a very small matter compared with a reduction of £165,000 in the coal bill. This is partly the effect of lower prices both of coal and oil and better working on the part of the carbonizing department, and the extended use of the oil-gas plant. Our wages paid for gas making are less by £22,000 than in December, 1901. Allowing for the diminution in expenditure in consequence of the reduced make of gas, there has been an appreciable reduction under this head, which has been brought about by the extension of both inclined retorts and mechanical stoking. The reduction in the item of wear and tear you would have doubtless expected. I told you this time last year that we had been carrying out special reconstruction work which had for a time swelled the amount under this head. The expenditure is still continuing, but not on such an extensive scale as in 1901. Under the head of distribution, you will see that no charge is made for meter-fittings. With the sanction of the Board of Trade Auditor, the amount expended during the half year for the extension of these supplies (which is £11,501) has been carried to the fittings account. But notwithstanding the addition of this sum to that account, under the system of liquidation which we have adopted, the balance on the suspense account has been reduced since July 1 by a net figure of £22,229; and it now stands at £111,918, as compared with £165,948 this time last year. The item of rates is still a serious burden upon our industry, as you doubtless know from personal experience. The rates in the pound are going up year by year. This year we have to record an average advance from 7s. to 7s. 6d. in the pound; and this upon our total assessment equals £17,500 a year. Now we are threatened with another serious imposition. The latest form of taxation is that proposed by the Thames Conservancy Board, which forms the subject of a Bill. The scheme, as set out in the Bill which is deposited in Parliament, provides for imposing a rate of 4d. a ton upon coal, and also upon oil which is specifically described in the schedule as "Oil to be used for gas-making purposes only." A rate of the same amount is also proposed for coke. Similar rates are scheduled for sulphate of ammonia, pitch, and, indeed, for most of the residual products of a gas company. In addition to these, rates are also to be levied on many classes of materials which we use in our various works. This, if it were carried out, would undoubtedly mean an addition to the price of gas in the Metropolis of something between ½d. and 1d. per 1000 cubic feet. So it is fortunate for the consumers of gas that, in consequence of the dissatisfaction generally felt throughout the Port of London with the proceedings of the Thames Conservancy Board, the Board may not remain in existence long enough to give effect to these propositions. It is, however, quite possible that any new authority for the Port of London will range itself with other similar bodies, and seek to provide the funds necessary for their schemes by a further taxation of the industries which are already carried on in London under comparatively great disadvantages—one of the greatest being the serious competition of the trading departments of our municipal authorities. Perhaps you will allow me to read an extract from a speech which, I think, is to the point, and which I saw in yesterday's "Times." Mr. J. S. Nettlefold, speaking at the dinner of the Birmingham Ironmongers' Association, said:

> For instance, one corporation boasts of a large tramway profit, and steps were taken to examine the accounts, and it was found that £300,000 had been charged to the Public Works Committee of this corporation for street widening, necessitated entirely by the installation of the tramway. Some of the municipal traders reminded him of the child who made a good profit with the poultry when his parents provided the money for the food and upkeep and paid also for the eggs. It was only natural that municipal trading should be unsuccessful. Who would subscribe to a company the Board of which was elected by its own employees? In private undertakings, when people failed they were ruined; but in municipal undertakings, if a failure was made there were a few unkind remarks made at public meetings, and some caustic criticism at the meeting, but no one was a penny the worse. It must not be forgotten that public bodies were affected by the loudest shouters; and it would be necessary to shout against municipal trading as loud as, or louder than, those shouting for it.

And it would be the duty of those in the gas industry to shout against the proposals to be laid before Parliament this year by municipal authorities. There is another paragraph which I may read to you with regard to electric lighting by the Marylebone authorities. I see that it is stated:

> In the case of the Marylebone electric lighting scheme, we are informed that the Umpire appointed to assess the value of the Marylebone electric supply undertaking, which is to be absorbed by the borough, has awarded £1,212,000 as the price to be paid to the Company.

Well, all I have to say is that if the ratepayers of Marylebone borough are so unwise as to agree to this extravagant expenditure of public money, we will do all we can, by fair and keen competition, to make the enterprise a failure. The question has lately become so acute that it is hoped Parliament will devote its attention to it in the coming session; and I believe there is every prospect of this taking place. The only other item in the revenue account calling for remark is that of £5000 on account of stamp duty, which, according to the judgment of the Court of Appeal, is payable in respect of the operation of the conversion and consolidation of our various stocks under the Act of 1898. Whether the intention of the Legislature when considering the Stamp Act of 1891, was that its provisions should apply to such operations as ours is not a question for us. It is sufficient for us that, in the opinion of the Law Courts, we are liable for the amount claimed. So far as we can ascertain, in the absence of definite figures, the full amount payable to the Crown will be met by a charge of £5000 in the current and the forthcoming half years. The next item is in the net revenue account—interest for temporary loans. This shows a reduction of nearly £5700, and is owing to the fact that we have had sufficient working capital of our own, and have not had to borrow from our bankers. Upon referring to the balance-sheet, you will see that whereas on December 31, 1901, we owed our bankers £100,000, on December 31, 1902, we had with them on deposit the sum of £200,000, so that we are better off to-day by £300,000 than in 1901. The net result is that, after charging interest and dividend on debenture and preference stock, there is a profit for the half year of £332,331 19s. 3d., which is equal to a dividend of £4 7s. 2d., and short of the amount of the dividend we recommend to-day by £3018. As, however, in the June half year account we had a small surplus of £3330, we have an amount of profit—all earned during the year—sufficient to pay you a dividend for the six months at the rate of £4 8s. for the year, or £2 4s. for the half year. This, with the dividend paid in June last, gives an average rate of dividend of £4 4s. for the whole of the year

1902. But the dividend which the Company would be entitled to divide under the sliding-scale clause, had the divisible profits been sufficient, is £4 18s. per cent —that is, 4 per cent. *plus* 2s. per cent. for each 1d. in the price of gas below 3s. 9d.; our present price being 3s. So we are dividing this year 14s. per cent., or £106,702, less than we should have done had our price yielded a sufficient margin over expenditure. It would appear, therefore, that had there been no other consideration, it would have been better for the shareholders if we had adopted the same course as the other Metropolitan Gas Companies, and maintained a larger proportion of the addition to the price of gas which was rendered necessary by the advance in the price of coal in 1900. Had we reduced our price in January, 1902, 4d. instead of 5d., our profits would have been almost sufficient for the payment of a dividend at the full statutory rates. It is only fair that I should give the figures of the respective additions and deductions in the price of gas in the Metropolis. The South Metropolitan Company put on 3d. at Lady Day, 1900, for 16-candle gas, and 4d. at Midsummer, 1900, making a total increase of 7d. They took off at Midsummer, 1901, 3d., which leaves an addition of 4d. to their price as it was at the commencement of 1900. Their actual reduction is 5d.; but 2d. is in respect of the decrease in the illuminating power from 16 to 14 candles. The Commercial Gas Company put on 6d. at Lady Day, 1900, and took off 4d. at Midsummer, 1901, leaving an addition of 2d. to their price as it was at the commencement of 1900. This Company put on 6d. on July 1, 1900, and took off 5d. on Jan. 1, 1902; thus leaving an addition of 1d. to our price. So that you see, whereas the South Metropolitan Company and the Commercial Company have retained 4d. and 2d. respectively of the advance, we have, with one-sided liberality towards the consumers, retained only 1d. There is another aspect in this shortage of divisible profits which the London County Council ought to appreciate; and that is that if the shareholders, when the price of gas is reduced, do not obtain the corresponding and statutory increase in the rate of dividend, or something closely approaching to it, they cease to have a direct interest in the question of further reductions. Indeed, I think it was in consequence of this view, as expressed by the London County Council when discussing the point, that Sir James Rankin's Committee recommended that shareholders should in future participate to a greater extent than formerly in the economies effected by the Metropolitan Companies. As you know, I have always held the opinion that respect should be had within reasonable limits to the sliding-scale settlement, so as to insure its being a reality and not a sham in any sense of the word; and it is satisfactory to find, on reference to the accounts of the other Metropolitan Gas Companies, and of some of the principal Suburban Companies, that this opinion is generally acted upon. With this statement of facts, I must leave this part of the question, because it will doubtless be again seriously discussed before a Parliamentary Committee, when the Company's Bill and that of the London County Council are under consideration. I am unwilling to anticipate the course of proceeding then by any debate on the present occasion; and I am quite sure the meeting will see the propriety of adopting this course. As regards the prospects of the working of the Company for the present year, I do not propose to say more than this—that the Court would not have recommended on this occasion the payment of a dividend at the rate for the whole year of £4 4s. per cent., had they not been assured that there was every probability that the rate could, and would, be at least maintained for the whole of the year of 1903. I now beg to move—"That the report and accounts be received and adopted."

The Deputy-Governor (Mr. Howard C. Ward): I beg to second the motion.

Sir George Livesey: Mr. Chairman, you have said nothing in your speech about two paragraphs in your report.

The Chairman: That will come later, when we get to the Wharncliffe meeting.

Sir George Livesey: I think I am in order in dealing with this question now on the report. Moreover, I am afraid you have not said much to allay the great anxiety that possesses the minds of the shareholders generally as to the position and prospects of the Company—an anxiety equally shared, though perhaps to an intensified degree, by the members of the Board. That there is great anxiety there can be no question whatever, because everybody knows it. This anxiety is, I think, due to two causes—one is the fall in dividend, the fall in the value of the stock, and the decrease in business. That is one of the causes. Another cause is due to the great uncertainty as to the future which has hung over this Company for a great many years—many more years than I think it ought to have hung over it. Now, dealing first of all with the fall in dividend, I may state that the high-water mark of dividend was equal to 5½ per cent. on the present converted stock.

A Shareholder: How many years ago was that?

Sir George Livesey: Ten or twelve years ago, and the business has been going back nearly all that time. That was the high-water mark of dividend. The dividend last half year works out at £4 4s. per cent. (I am speaking on behalf of the ordinary shareholders, as those are the persons who bear the brunt of everything). This works out at something like £640,000 as the amount of dividend distributed among the ordinary shareholders for the year. If they had had a dividend equal to the high-water mark of ten years ago, they would have had £198,000 more. They are therefore sustaining a fine of something like £200,000 a year because the price of gas is so much higher than it was then. This is a unique position. No other company has sustained anything like a loss of that kind. Then there is the serious thing of the fall in the value of the stock. The stock is now 87. It was about 120 after the conversion, and then it went down to 110, then to 95, to 85; and now nobody knows where it is going. Nearly all gas people of any experience have this sort of thing happen to them: Shareholders in this Company come to them to ask for advice. Only yesterday I was talking to two gas men who told me that quite recently shareholders in this Company asked them what to do, as they were large shareholders. They said: "Shall we sell, or what shall we do?" My friends said they could not advise them, as they did not know what was going to happen. That is a very serious matter. Then, as to the business of the Company, I find, taking the half year ten years ago, the quantity of gas sold came to 9500 million cubic feet. The last half-year's increase over that of ten years ago is just 8½ per cent. This is also unique. I doubt whether there is another gas company where the increase has been so small. I find from 1892 to 1897, taking the December half year, there was an increase of 10 per cent. The year 1897 was in excess of 1902 by 1½ per cent. We have gone back in the five years just 1½ per cent. in the business. This is a serious thing. Then there is another fact. I remember the Chairman saying that the Company has no friends; and I am afraid that is true. (Hear, hear.) This is a serious matter; and it tends largely to depress the position of the Company. I am not going into the reason why the Company has no friends, because I do not want to find fault with the management, or anybody else; but these are the facts which seem to me to cause great anxiety to the shareholders. Then there is great uncertainty as to the future. This has been going on for many years. It culminated, or ought to have culminated, in the inquiry which was instituted by Parliament into the management of this Company, by Sir James Rankin's Committee in 1899. That Committee was appointed to consider the London gas supply generally. But it was really concentrated on the affairs of this Company, and the Committee reported to Parliament. I think that the opportunity should have been taken; and the Board must excuse me for saying there was a want of statesmanship at the time—though perhaps one should not expect statesmanship in such a common-place business as that of gas supply, although these are great businesses and are worthy of the ability of statesmen to manage them. However, in 1899, it seems to me the Company might have put an end to the uncertainty. The wise course would have been to have met Parliament's wishes. Instead of that, a Bill was introduced ignoring the main recommendation of Sir James Rankin's Committee; and it met with the reception that almost everybody expected it would meet with. In 1901, a similar Bill was introduced, with the same result. The consequence is that the state of uncertainty has been prolonged; Parliament has been made angry; and the terms which might have been obtained in 1900 cannot be got now. If the Bill which has now been introduced had been brought up in 1900, proposing a reduction of 3d. in the initial price, I have every reason to believe it would have been accepted by Parliament; but I have every reason to believe that it will not be accepted now. (A Voice: Why?) It is not enough, seeing that the Commercial Company have accepted a greater reduction. It is absurd for this Company to suppose that Parliament will accept such a paltry reduction as is proposed—from 3s. 9d. to 3s. 6d. It is said that the sliding-scale is sacred, and ought not to be violated; but the sliding-scale has been a failure here. It was introduced not to give increased dividends to the Company, but to lower the price to the consumers; and if it has failed in securing this object, Parliament is right in saying that it must be reduced or altered. That is the reason for the recommendation made by Sir James Rankin's Committee. That Committee recommended a reduction of the initial price, but allowed an increase—in the increment of dividend from 2s. to 2s. 8d. per cent. per penny of reduction in the price of gas—to meet the loss, if the price was reduced to a reasonable figure. Supposing there had been free competition in gas in London, what would have been obtained? You must have supplied gas at the same price as the other people; and what would have been the result? If you had not supplied it, you would have been bankrupt. But that would not have happened, because you would have sold gas at the same price—perhaps not paying so high a dividend as the others, but you would have paid a good dividend through economies in management. That would have been inevitable if you did not wish to be ruined. I come now to another subject. I say that your Bill is no use. I have read the Bill of the London County Council; I have read it carefully. I know you do not regard me as a friend; but if the Board had listened to what I have said during the last ten years, and treated me rather as a friend than as an enemy, the position of the Company would have been better than it is now. ("Hear, hear.") I have no love for the London County Council; but I have read their Bill, and I think, with one or two modifications, it is a reasonable Bill, and one that you would do wisely to accept. One point is they ask for a reduction of illuminating power. Seeing that the other Companies have reduced the illuminating power from 16 to 14 candles, and are thereby enabled to sell gas cheaper—because that, after all, is what the public look to, and it does not cause consumers to burn more gas—I think you will have to fall into line there; and that involves a reduction of 2d. in your initial price. The London County Council simply take the recommendation of Sir James Rankin's Committee, and propose that your initial price should be reduced 6d.—that is, from 3s. 9d. to 3s. 3d., *plus* 3d. To suppose that you will get off with less than the 6d. which that Committee recommended, is absurd. Parliament will insist upon that. Then I think you will also have to accept a further 2d.; bringing the initial price down to 3s. 1d. There is a little element of unfairness in the Bill in this particular. To fix this Company with 3s. 1d. as the initial price would be unfair, as we are liable to great fluctuations in the price of coal; and I think it would be fairer that, instead of an absolute 3s. 1d. initial price, there should be a neutral zone of 2d.—that is, that the dividend should not be increased beyond the statutory 4 per cent. until you go below 3s. 1d., but, on the other hand, it should not be reduced until you went above 3s. 3d. There is one other point in the Bill with which I cannot agree, and that is the question of testing. If you are to reduce the quality from 16 to 14 candles, there must be a 2-candle reduction, or you cannot afford to reduce the initial price by 2d. By some mental twist of the Professors, the Referees, and the Chemist to the London County Council, they have an idea that if you reduce the quality to 14 candles it must be tested in some peculiar way that will compel you to supply over 15-candle gas to register 14 candles. Parliament has laid it down that the test-burner is to be a suitable burner for the consumer, and it shall be used in such a way as to develop the utmost light that can be obtained from the gas. The regulation is that you are to reduce the gas 2 candles, and the initial price 2d. But by the Bill which they will introduce, you will only get a reduction of 1 candle, which is unfair. With these, and perhaps one or two other slight modifications, I contend that the Bill of the London County Council is a fair one; and if I were in the

chair, I should recommend this Company to agree with their adversary on those lines. Now, what would be the effect upon the shareholders? You could not get more than 4 per cent. unless the price goes below 3s. 1d. You will never satisfy your consumers until you reduce your figure to approaching that of the other two Companies. The Commercial Company are down to 2s. 6d., and the South Metropolitan Company to 2s. 3d. for 14-candle gas. If you would come down to 2s. 8d., you would go a long way towards satisfying everybody, and give an assurance to the consumers that you want to do the best you can for them. If you came down to 2s. 8d., you would be entitled to £4 13s. 4d. per cent. on the ordinary stock.

The GOVERNOR: If you can earn it.

Sir GEORGE LIVESEY: There is a difference of 4d. between your case and that of the South Metropolitan Company. It costs you 4½d. more to pay your dividend of £4 8s. than it costs the South Metropolitan Company, due to a difference in the capital. Why should there be a difference of 9d. in the price of gas? If you could come down to 2s. 8d., you would still have 5d. difference between this Company and the South Metropolitan Company. If they can sell gas at 2s. 3d. per 1000 cubic feet, you ought to be able to sell it at 2s. 8d. I cannot see why there should be a difference in manufacture, and why one Company should not do as well as the other. If you can agree with your adversary, you should do so; for there never was a more urgent need for it. I know they are nasty people to deal with; but if you made a genuine, honest attempt to do it, you would disarm them. It would go far to convince Parliament that you wish to do what is fair. The shareholders would then be relieved from their state of uncertainty, and they would feel that their 4 per cent. at least is safe, which is equivalent to 10 per cent. on the converted stock. If that were assured, I am certain there would be no further drop in the Company's stock.

Mr. WARNER said that, as a large shareholder in the Company, he did not like to see the value of his securities decreasing, and thought steps should be taken to put a stop to any further decline. The last speaker had stated that there were reasons why the Company had no friends; and surely one was the way in which they went to Parliament. Everyone was aware that whenever they applied for a Bill they got badly beaten. It was the opinion of many shareholders that what was wanted was the infusion of new blood upon the Board. He made the suggestion with all due respect to the Directors, knowing that they had the interest of the shareholders at heart; but the opinion unmistakably now was that new blood should be introduced on the Board.

Mr. HALL said four years ago he came to London and bought £30,000 of stock upon the faith of the prospectus which was sent out, representing the condition of the Company, what was being paid in dividend, and what was likely to be paid in future—namely, £4 18s. per cent. This £30,000 of stock was placed among his clients—a fair amount being held by himself; but there was no security which he had had to deal with that had given him so much anxiety as this wretched stock. Instead of receiving £4 18s., six months ago he received only 4 per cent., and now it was proposed to distribute £4 8s.

A SHAREHOLDER remarked that he supposed it would presently be 2½ per cent.

Mr. HALL said it might be so. The Gaslight and Coke Company was supposed to be the first Company in the City of London; but it appeared not to be capable of managing its affairs, and was going into the background. The outcome of the present meeting should be the promotion of a Shareholders' Protection Association. He personally should be very glad to contribute largely to it; and he felt sure that people in the Provinces would subscribe also, in order to bring about a more healthy condition of affairs than existed at the present moment. Upon that Association all stockbrokers would be barred. The present condition of the Company was simply monstrous. He was in the room when the stock fetched £125, as everybody believed in the *bona fides* of the Company; but now it was down to something like £94. This was a most serious matter to widows and single women, who put their money into the Company believing it was above suspicion. He had been so much worried of late about the state of affairs, that he made up his mind to come to the meeting and express his feelings fully, believing that he should meet with a very large amount of support. Why should they have been mulcted in the matter of dividends? Simply because of the bad judgment of the Board. Why should the Directors have reduced the price 5d. per 1000 cubic feet? Who would thank them for skinning themselves? No one. It was an uncomfortable feeling, and nobody thanked them for it. What was wanted on the Board were men who would have made a proper reduction of (say) 2d.

A SHAREHOLDER: Our Directors are behind the times.

Mr. HALL said this was his opinion; and he thought it was the duty of the Directors to retire, in order to make way for more able men. (Hear, hear.) No doubt, there were many connected with the Board who would not think so; but he did hope that there were others present who would form a Shareholders' Protection Association, by which the shareholders might hope to be dealt with more fairly in the future than in the past. Upon the £30,000 of stock which he bought a few years ago, there was a dead loss of £9000. This was a horrible state of affairs, and was not to be found in the case of other gas companies. He was a large shareholder in the Bath Gas Company and the Brighton and Hove Company; but he did not find things managed there as they were in this Company.

Mr. STAPLETON said he had a small holding in the South Metropolitan Company; but he was sorry to say his holding in this Company was five or six times as great. One could not help comparing the two Companies, although he knew that comparisons were odious. Those who had known the two Companies for years could not fail to be struck with the difference between them. He did not know Sir George Livesey; but that gentleman had made use of two words which were exactly appropriate—one was "anxiety," and the other "uncertainty." That was just the feeling of the shareholders. There was great anxiety and great uncertainty, and great discontent. When the Chairman was making his statement as to the fall in price, and comparing it with that of other companies, he forgot to mention that the price of the Gaslight and Coke Company was 3s. per 1000 cubic feet, while the South Metropolitan Company's charge was only 2s. 3d. Again, when the Company went to Parliament, there had always been a want of conciliation and tact on the part of the Directors. When charges were made in the Press or the Committee-room, no reply was made to them, with the result that people naturally took it for granted that what was stated was true. Now, who was to blame for this? Surely it was those who had the management of the Company. He was sure that things might have been managed better than they had been. Had the same efforts been made to get consumers as had been made in the South Metropolitan Company's district, the Company would have made many friends instead of enemies. He thought it would be a very good thing to induce the consumers to become shareholders, as had been done by the South Metropolitan Company, because when people became copartners, they had an interest in the concern, and tried to do their best for it. He would suggest that in future reports of annual meetings should be sent out to each shareholder, the same as was done by the South Metropolitan Company. The expense would be very slight, and it would prevent many people from grumbling.

A SHAREHOLDER: The Directors of this Company are behind the times.

Mr. HOPE, M.P., expressed his concurrence in the views of Sir George Livesey. From an expert point of view, he did not know that one could add anything to what had been said. The Governor had made a statement that the reduction in the price of gas had not been followed by an increase in business; but when he was in the House of Commons last session on one or two Gas Bills, he heard expert evidence given to the effect that cheap gas meant good business for the companies, and dear gas bad business. If consumers had ceased using gas altogether, it did not much matter whether the price was reduced; and that was evidently what had happened according to the report. From the figures given in No. 12 account, for "Private Lights per Meter," it appeared there had been a reduction; and, of course, they could not tell to what this was due. But under the heading of "Public Lights," there was a considerable reduction, which was due no doubt to the fact that public authorities used more electric light than before. The question he should like to ask was this: Were the Court of the Company really doing their best, according to expert knowledge, to keep pace with their rivals? What were they doing with regard to incandescent lighting? He (Mr. Hope) had nothing whatever to do with the Welsbach Company; but he knew that the Welsbach light was an extremely good one, and that it penetrated even fog far better than did the electric light. What steps had been taken by the Directors to develop the use of the Welsbach burner? Wherever gas had been displaced by the electric light, it was not the Welsbach system that had been superseded. No doubt there was considerable expense in starting a Welsbach installation; but it had been done by the South Metropolitan Company. Again, did the Company take proper steps to obtain the sympathy of the public? Where there was keen competition, one might expect great promptitude in obliging customers; but that was not his opinion. As a Member of Parliament, he was quite certain that the Company might expect a nasty fall if they went to Parliament in a bellicose spirit. Unless they came in a different spirit, they would meet with the same fate as before. Unless the Company put themselves in a different way from what they did in the past, the shareholders would conclude that there was no other means of getting out of the difficulty than by making a drastic change of some kind or other in the management.

Mr. QUICKE asked whether, when the illuminating power of gas supplied by the South Metropolitan Company was reduced from 16 to 14 candles, the gas supplied by their Company was also reduced to 14 candles.

The GOVERNOR: No; there is 2d. difference. As no one else has any questions to ask, I will begin by answering the remarks of the last speaker. So far as regards the promotion of the incandescent system in our district, everything has been done that possibly can be done. We have appointed, as I said in my speech, a department for dealing with incandescent mantles. We maintain them at a fixed price; and, with regard to public lighting, we have offered, and in many cases made, arrangements with the public authorities for changing from the flat-flame to the incandescent system—finding the money ourselves, in the same way as the South Metropolitan Company have done, and spreading the payment over a series of years. There is no shyness on our part with regard to the incandescent lighting system. We have done everything to increase and extend it. I am a little at a disadvantage in replying, because Sir George Livesey would not allow me to deal with the general meeting and then take the discussion on the Bill at the Wharncliffe meeting; but as the Bill has been discussed, it will be better for me to deal with it before I put the resolution. With the proprietor from Bath, who spoke with so much indignation, I can sympathize very deeply, as I am a large holder of stock in the Company, and naturally I should not have left undone anything in my power to prevent such a loss. But that proprietor has really answered Sir George Livesey. Sir George Livesey says: "Reduce the price to 2s. 8d.;" and then Mr. Hall says: "Keep it up to 3s. 1d." Those criticisms answer each other. As a matter of fact, it is no use—I have said it before, and I say it again, and I defy anybody to controvert it—it is no use to institute comparisons between companies carrying on business under varying conditions. It has been stated over and over again, and explained, what the differences are between this Company and that on the south side of the Thames. We are an older Company, and have a larger capital; but the point of the whole thing is this—that we are in a district in which the competition from electric lighting is tenfold as great as in the South of London. If there were no electric lights, and we sold all the light in gas which is supplied by the Electric Lighting Companies, it would be equal to an addition of one-third to the whole of the sales of this Company. I do not know what the conditions as to electric lighting are in South London; but I should say it is quite a fraction of that. Every shop, as you know, in the West-end has the electric light. We sell our gas to the extent of at least 50 per cent. for fuel and for power. We have abstained from putting the weather into the forefront this year, because we have been so often twitted with doing it. But it has come into the reports of other companies; and it is obvious that, where the larger part of the sale is for fuel, the condition

of the temperature must have had a great deal to do with it, and this is just what we have found. The mild weather we have passed through only last week, as compared with last year, accounts for a reduction of 8 per cent. If we had had a diagram showing how the consumption jumps up and down, corresponding with the movements of the thermometer, you would understand at once how much the weather has to do with it. As regards the Bill of the London County Council and our own Bill, perhaps I had better read the remarks I have prepared, because it will then be more intelligible, and they will answer a good many of the things which have already been said. Would you like to have the heads of the Bill read, or are you familiar with them?

Several SHAREHOLDERS: Let us have them read.

The GOVERNOR: This is a little informal; but it arises out of the awkwardness of the position into which we have got. Of course, we shall have to read the notice convening the Wharncliffe meeting in order to make it formal.

The SOLICITOR then read the heads of the proposed Bill.

The GOVERNOR: The history of our application to Parliament is as follows: The first Bill in 1899 was for power to create £2,500,000 of debenture stock, which, according to our then experience, would have been sufficient for a period of ten to twenty years, according to the rate of increase in the Company's business. No provision was made for any alteration of the terms of the sliding scale clause. Powers were sought for the purchase of additional land; and this Bill passed the House of Commons, and was rejected by the House of Lords. In 1900, we went for the same Bill again; but it was rejected by the House of Commons. The third Bill in 1901 resembled that of 1900 with respect to the mode of raising additional capital; but the amount was limited to £1,000,000—sufficient only to last some five years. That was in accordance with the suggestion of Sir James Rankin's Committee. For the first time in the history of Metropolitan Gas Legislation, provision was made for dealing with what is termed obsolete capital, in view of the recommendation of Sir James Rankin's Committee. This measure was opposed on the occasion of its second reading in the House of Commons, and withdrawn; but I am convinced it was only opposed because its provisions were not understood. In both cases, I am sure Sir George Livesey will admit there was conciliation.

Sir GEORGE LIVESEY: There was no proposal to accept the recommendation of Sir James Rankin's Committee.

The GOVERNOR: We proceeded to accept the recommendation with regard to obsolete capital.

Sir GEORGE LIVESEY: But not as to a reduction of initial price.

The GOVERNOR: In 1901, two events considerably re'ieved the financial pressure. With the assistance of you gentlemen, we were able to place the balance of our unissued capital; and the sudden and material fall in the price of coal and other material, greatly reduced the amount required for working capital. Then there had also been unfortunately, which we could not have gauged, a falling off in our business. This is due, as I have said, to the electric light, *plus* the very mild winters which we have had ever since 1894. Under these circumstances, there was certainly no necessity for us to risk another rebuff the following year by going to Parliament; and the respite gave us the opportunity of considering to what further extent we could remodel our application with a view to complying with the recommendations of Sir James Rankin's Committee, having due regard to the rights secured to the shareholders by parliamentary enactments in the past. The result of our deliberation was that we, again in the interest of the public, arranged that the whole of the capital we applied for should be issued in the shape of debenture stock. By raising it on debenture stock, it could be placed at a rate cheaper by 1 or 1½ per cent. than ordinary stock; and at present our loan capital does not represent such a proportion of our total capital as it should do when compared with other gas companies. In 1876, Sir James Farrer, the then representative of the Board of Trade, expressed a strong opinion that the Company should be allowed to increase very largely the proportion of their borrowed capital; and he referred with approval to a 50 per cent. limit. In this Company, the loan capital only represents 16 per cent.; and this addition would raise it to 20 per cent. of the entire capital. Nearly the whole of the £1,000,000 we asked for would be required to meet expenditure during the next five years on the mains, service-pipes, meters, stoves, &c. The next proposal in the Bill is with regard to standard price—that which regulates the rate of dividend—that it should be reduced from 3s. 9d. to 3s. 6d. Considering that we have already voluntarily given up charging meter-rents, which represents about 1d., this reduction of 3d. is precisely equivalent to what was agreed to by Parliament in the case of the Commercial Company last session, and to the extent of 1d. per 1000 cubic feet it would reduce the difference which has existed since 1876 in the standard price between our Company and that on the south of the Thames. This has always been done. It varied slightly when the South Metropolitan Company were troubled with their strike. The difference was reduced for the time; but normally it has been 9d., and at the present time it is a little less. To talk of reducing the price of the gas supplied by this Company to something like the price of the gas sold by the South Metropolitan Company, is simply to speak of the annihilation of the dividends of the Company. ("No, no.") If we sell our gas at the same price as it is sold on the south of the Thames, our dividend will go to 3 per cent. In making the proposal, it must not be thought that we have in any degree modified our view that such an alteration involves injustice to those who have, at the Company's auction sales (which have been held from time to time since 1876) paid high premiums for taking up our stock. We have an example of this. On the faith of the provisions of the Act of Parliament, the gentleman from Bath and his friends bought at public auction and paid a large premium for the stock. The result of our accepting the Bill of the London County Council—of course, if Parliament puts it upon us we must take it—would be to sacrifice your interest; and it would be an act of public dishonesty.

A SHAREHOLDER: You are begging the question.

The GOVERNOR: I think that is the question. However, neither Parliament nor the Board of Trade so far has given any weight to that contention; and therefore we have brought in our Bill with a view to putting ourselves into line with the latest legislation, with the exception of the candles. The sliding-scale dividend payable under the present adaptation of the recommendation of Sir James Rankin's Committee, is a variation of 2s. 8d. per cent. per annum for every 1d. of increase or decrease in the price of gas above or below the standard; so that, assuming for the sake of argument the continuance of our present price of 3s. per 1000 cubic feet, you would be entitled to an increase of six times 2s. 8d. over the standard rate of dividend of 4 per cent., or an annual rate of dividend of £4 16s.—being 2s. per cent. per annum less than you would be entitled to divide to-day if your profits admitted of it. It must not be forgotten that there is an unpleasant converse of this. Supposing the selling price of gas rose above 3s. 6d., you would forfeit 2s. 8d. of your dividend for every 1d. or part of 1d. charged in excess of the standard price; but we do not propose that the whole of the 2s. 8d. additional dividend should be distributed. For a period of about fifteen years, we should limit the rate of such addition to the same sum as is payable under our existing Acts—namely, 2s. per cent. per annum for every 1d. This, if applied to our present price, would give you six times 2s. over the standard dividend 4 per cent., or £4 12s. per annum, which would be 6s. per cent. less than you are now entitled to divide under existing circumstances. This amount deducted from the sliding-scale dividend is 8d. per cent. per annum, which, under the conditions to-day, would be multiplied by six. We, in view of the recommendation of Sir James Rankin's Committee (and here we have conciliation again), propose to set this apart for the purpose of the redemption of obsolete capital. The annual amount of such appropriation would be just over £30,000—sufficient, so far as we can see, to liquidate the whole of our obsolete capital in fifteen years. Let me interpose here a remark. Let us take the London County Council Bill, which Sir George Livesey has just advised us to adopt. This proposes that, instead of 3s. 6d., which we have in our Bill, we should go down to 3s. 3d. This means that, instead of taking £45,000 out of your dividend, they will take £90,000 out. They propose that, instead of applying 8d. to the redemption of obsolete capital, we should devote 1s. 4d., that is, instead of £30,000, which we propose under the Bill to apply to the redemption of obsolete capital, they propose £60,000. The obsolete capital arises in this way. At the instance of the public authorities and the Board of Trade, we were urged to take our manufacture out of the crowded parts of London—the City and Westminster—to the suburbs; and we had to raise capital and expend it at Beckton, and bring the gas 14 miles, instead of making it at Westminster and the other places Naturally, the cost of these old works still remained, or part of it that had not been written off by a depreciation fund; and that is what represents the present obsolete capital. The Committee presided over by Sir James Rankin recommended that an attempt should be made to reduce the amount of obsolete capital by contributions from revenue or otherwise; and with a view to adopting this recommendation, we propose to devote £30,000 a year out of the dividend fund towards the wiping out of the capital. This, we believe, will redeem it in about fifteen years. I think Parliament is not likely to think that too short a time, seeing that municipal authorities and others who borrow money and have capital which has to be redeemed, get thirty, forty, and even fifty years allowed for redemption. My colleague has handed me a list of the stations which were done away with—London, Westminster, Blackfriars, Brick Lane, Pimlico, Curtain Road, and Haggerston; so that you see what an enormous shifting there has been of the localities where gas is manufactured by this Company. The remaining clauses of the Bill deal with land purchases. In view of the extension of the Company's business in the future, we must have power to secure land which may be requisite for the business of the Company. We have no such land in view at the present time, and we are only taking the powers which are usual in this matter. The legislation proposed by the London County Council is limited to this Company; and it is a satisfaction to us to know that there is no precedent in the history of Parliament for giving legislation such as is now asked for. The capital of this Company has been raised on the faith of an Act of Parliament. The Act has formed the Charter, the title deed, the concession on which the capital is raised; and by this Bill the London County Council propose to take up your title deeds to tear them in two, to reduce your security, and that, I say, has never yet been done by Parliament. I cannot think that such an injustice will be permitted with regard to this Company; but if it is—if Parliament passes it—we have no alternative but to accept it. We want to put our case before Parliament why this should not be done; and I think, in your interest, you will say the Board are doing right in letting Parliament know what they honestly believe to be the circumstances of the case from beginning to end. The first matter they deal with is the illuminating power of the gas. This is the point to which Sir George Livesey has alluded. By the legislation of 1875 and 1876, the illuminating power of the gas was fixed at 16 candles for the whole of the Metropolis. At that time, the Metropolitan Gas Companies offered the strongest objection, inasmuch as in those days an illuminating power above 14 or 15 candles could only be obtained at a heavy cost by means of enrichment. A few years ago, the manufacture of carburetted water gas was introduced into this country; and by improved and economical means, carburetted water gas has been widely adopted, with the best all-round results. In our case, the adoption of the system has enabled us to reduce the cost of the manufacture of gas to a greater extent than has been the case where the system has not been adopted. It is, therefore, intelligible that a Gas Company, such as the South Metropolitan, whose gas has been enriched by a petroleum spirit, or other expensive enriching material, might be able, upon the adoption of a 14-candle power standard, to reduce its price to a far greater extent than would be the case with this Company, where the enrichment by carburetted water gas is effected at a nominal cost only. Of course, the consumers have reaped the benefit of this; but there would be another objection to the reduction in the illuminating power in the case of this Company. I am not going into the scientific question of the heating power of different gases as compared with the illuminating power; but it is not merely a question of pennies or candles. I am assured by the Company's technical advisers that I am justified in saying this: That the reduction in the illuminating power of gas made from coal and oil would, in our case, mean a reduction in the calorific value of the gas; and assuming, for the purpose of argument, that one-third to one-half

of our gas is used for heating purposes, one-third or one-half of our customers would, with 14-candle gas, require the burning of a larger quantity in order to get the same result in heating power. We should, therefore, lose in an important branch of our business which we have been building up. The London County Council's proposal is not for our advantage or for that of the consumers. The consumers would not secure any reduction, but would be supplied with a gas which to a large extent would be less suited to their requirements. But the next proposal is the reduction of our 16-candle gas standard price by 6d. per 1000 cubic feet. In no case has Parliament required this; and certainly Parliament has never enforced it. The effect of this provision, coupled with the London County Council's redemption fund provision, would be a reduction in your dividend, at a 3s. price for gas, from £4 18s. to £4 4s.—that is, 8s. per cent. more than we propose under our Bill. What advantage would this proceeding, which is so unjust to the shareholders, be to the consumers? A possible reduction in the price of gas of something less than ¾d. per 1000 cubic feet. But the mischievous intermeddling of the London County Council does not stop there. Their General Powers Bill contains novel and dangerous provisions, which, if sanctioned by Parliament, would enable the Metropolitan Borough Councils to further exploit electric lighting. The Bill provides that any Metropolitan Borough Council having power to supply electricity may spend money in supplying fittings and in wiring the premises, not only of the actual consumers, but of any prospective consumers; so that local authorities would thus be allowed to embark in competition—subsidized, of course, by the rates—with those firms and companies whose legitimate business it is to carry on work of this character. They are not only going to supply those who require electric light, but those who may at some time wish to have it. Such a scheme would lend itself to this abuse: If a speculative builder was erecting a row of cottages, let at a yearly rental of £30, or a block of artisans' dwellings, the Council could undertake to wire and fit up the tenements, whether they were occupied or not; and the working men residing in them would have, at the expense of the rates, fittings which you and I would have to provide. Any loss upon the transaction would come out of your pockets. Pray do not think I am romancing. The East Ham District Council, whose rates amount to 9s. 6d. in the pound, have just erected a block of workmen's dwellings, the whole of which are fitted with the electric light. There are several Bills before the House of Commons proposing similar Socialistic methods of dealing with the question; and I really think it is the duty of every gas company and shareholder to call the attention of his representative in Parliament to the very serious loss and unfair action which is threatened under these schemes of the municipal authorities. There is one point I wish particularly to refer to which was raised by Sir George Livesey. He says that Parliament will not be content in our case with a reduction to 3s. 6d. In the case of his own Company, there was a 3d. reduction. In the case of the Commercial Company, there was in their Bill a 3d. reduction, afterwards modified to one of 4d.; but the fact that they charge meter-rents and we do not brings our 3d. to the same figure of 4d. which was sanctioned by Parliament in the case of the Commercial Company. Why should a Company which has to contend with more difficulties than any other be penalized by an extra 3d.?

Sir GEORGE LIVESEY: That is not what Sir James Rankin's Committee recommended.

The GOVERNOR: He recommended that the price should be reduced to 3s. 3d. all round. The standard price of the South Metropolitan Company was 3s. 6d.; that involved 3d. in their case. The standard price of the Commercial Company was 3s. 9d. They went to Parliament, as we do, and offered a 3d. reduction; and Parliament granted it. It did not enforce the recommendation of Sir James Rankin's Committee that the price should be reduced by 6d. Why should this Company be penalized in the way that no other Company has been? Assuming, for the sake of argument (though I do not admit it), that we have neglected and mismanaged your business, the penalization of the extra 3d. over the other Companies would be punishing you for the misdeeds of the Board, to which you might be a party, by electing the Board, but to which you were very indirectly a party. It is our duty to follow the lines already laid down by Parliament, and not to bare our neck to the knife of the London County Council, and take the Bill in the form in which they desire to have it passed. I think I have replied to everything which has been said in the course of the remarks that have been made; but if I have omitted any question, I hope it will be repeated. I think I have neglected to answer Mr. Hall. He says our dividend went down from £4 18s. to £4. First of all, it went down to £4 8s.; but he quite forgot to mention what was the cause of its doing so. The cause was the enormous increase in the price of coal, which went up to 20s. a ton. Every other gas company suffered in the same way. As soon as the price of coal went down, the price of gas went down also.

Mr. HALL remarked that the Directors stated in their report that had they not reduced the price of gas they would have been able to pay the usual dividend.

The GOVERNOR replied that the consumers had been hammering at the door for a still further reduction.

Mr. HALL said he objected to the Directors giving way to the public voice. It was the duty of the Board to support the shareholders, and not to listen to the clamour of outsiders.

The GOVERNOR said he hoped the shareholders would support the Board, who had always tried to safeguard the interests of the shareholders. If the Board had not the support of the shareholders, it would be impossible to safeguard their interests.

Mr. HALL remarked that the proper way of supporting the shareholders' interests was by good management.

The GOVERNOR said they were perfectly prepared to submit their management to Sir James Rankin's Committee, and to have it thoroughly sifted. That Committee made a rather wide statement—namely, that upon the evidence it appeared that the affairs of the Company had not been well managed; but they never said when. The time of mismanagement—if there had been mismanagement—had long gone by.

A SHAREHOLDER pointed out that for many years the price of stock had been going down; and unfortunately there did not seem any chance of its rising again. What was wanted was new blood on the Board; and he thought it was time that the shareholders did something in this direction. He suggested that the gentlemen who retired by rotation that day should retire for once and all. The shareholders could not be satisfied with their management after what they had heard that day. He thoroughly agreed with the remarks that had been made, that it would be better to adopt the Bill of the London County Council.

The GOVERNOR said as complaint was made of the fall in the price of stock, he might point out that the price of London and North-Western Railway stock had gone down since February, 1897, when it was 206, to 167. The same cause had effected the price of gilt-edged securities all over the country; and it was not fair to say that their Company alone had suffered in the market value of the stock.

The resolution for the adoption of the report and accounts was then put and carried with three or four dissentients; and the dividends recommended were also declared.

The GOVERNOR then vacated the chair, which was occupied by Mr. ULICK J. BURKE.

The CHAIRMAN announced that Colonel Sir W. T. Makins, Bart., Mr. Howard C. Ward, and Mr. Corbet Woodall, retired by rotation, and that they offered themselves as candidates for re-election. He had much pleasure in proposing that all three gentlemen be re-elected.

Several shareholders strongly protested against the names being coupled.

The CHAIRMAN said that being so, he would put them separately. He begged to propose that Colonel Sir W. T. Makins be re-elected a Director of the Company.

Mr. J. BIRCH PADDON seconded the motion, which was put to the meeting, when 55 voted for it and 25 against.

The CHAIRMAN having declared Colonel Makins elected, a poll was demanded by a shareholder, who said he held £60,000 of ordinary stock; and it was stated that the poll would be taken at the close of the meeting.

The CHAIRMAN then proposed the re-election of Mr. Ward.

Mr. PADDON seconded the motion; and upon its being put to the meeting, 46 voted for it and 30 against.

The CHAIRMAN declared Mr. Ward elected; and in this case a poll was not demanded.

The CHAIRMAN next proposed the re-election of Mr. Corbet Woodall.

Mr. PADDON seconded the motion.

Sir GEORGE LIVESEY said he hoped that in this case the election would be unanimous.

Mr. CORBET WOODALL: Before this resolution is put, I desire to say a few words. I should like the shareholders to understand distinctly—having regard to the discussion which has taken place, and the observations that have been made as to the price of gas—that I was prepared to put my resignation in the hands of my colleagues if the reduction in the price had been less than it was. I think this explanation is due to the shareholders, because the policy that was adopted by the Board in regard to the reduction in the price of gas was one that had my entire sympathy, and will have in time to come, whether I am on this side of the table or the other. I think the arguments which have been used with regard to the price of gas and its relation to dividend, have been in some respects unwise. There are ways in which the profits of the Company may at times be used to greater advantage than in the payment of dividends. This is not a Company existing for to-day or for the year, but, we hope, for an indefinite time to come; and it is quite possible that the money divisible among the shareholders may be put to better use in consolidating the position of the Company than in the payment of the uttermost farthing that the shareholders are entitled to. I felt it my duty to say this, because I should be sorry to be re-elected to a seat at the Board under any misapprehension. If I may be permitted to say one further word, it is to express my extreme regret at some of the criticisms that have been offered to-day. We have as a shareholder a gentleman who is welcomed everywhere among those engaged in our industry—a gentleman whose acquaintance with the details of that industry is probably wider than that of any other man living, a man whose opinion is held in the highest esteem, and rightly so when he speaks upon questions of what may be called gas policy—and it is only in this room that I listen to him with feelings other than those of pleasure. But I say that the criticism offered by Sir George Livesey to-day, following on the lines adopted on previous occasions—criticisms upon a Bill which the Company are promoting at the present time, damning our own Bill in terms so emphatic as he has done, and at the same time speaking as an advocate for the opponents of this Company, who have frequently been charged by him with unfairness in their treatment of the gas industry in London—has not been the action of a friend. Sir George Livesey said that this Company is without friends. I believe that the Company is in some respects wanting in friends for some causes which it might have remedied itself; but among all the causes which have gone to rob us of friends, the action taken by Sir George Livesey as a shareholder has been the greatest. ["Hear, hear," and "No, no."] The very height to which he has risen, and the estimate in which he is held, make his criticism of the greatest importance. But no shareholder listening to those observations could feel other than that they have not been the criticism of one who desires to see the evil removed, but that they have been largely the expressions of personal anger.

Sir GEORGE LIVESEY said he did not, in the remarks which he had made as to the reduction of price, intend to include the last speaker, as he knew that he had always struggled very hard to promote the same object for which he (Sir George) had struggled. The only word in defence of himself which he would utter was this: The high price charged by the Gaslight and Coke Company had been detrimental to the gas industry throughout the kingdom; and if the price was reduced, it would be not only for the benefit of the shareholders, but of everyone. He hoped the gentleman who suggested that a report of the proceedings should be sent to each shareholder would move a resolution to that effect. It had been suggested on a previous occasion, when the Chairman said it could not be done; but it was done by other companies, and could be done by this.

The resolution for the re-election of Mr. Corbet Woodall was then put and carried unanimously.

The GOVERNOR then again occupied the chair, and tendered his warmest thanks to those ladies and gentlemen who had given him their support. He said that, after the divided support which for the first time had been given him that day during his nearly forty years' association with the Company, he would, in ordinary circumstances, have felt it his duty to resign his position; but in view of the fact that many absent proprietors had forwarded proxies in favour of the policy of the Board, he did not think it would be fair to them if the proxies were not used at the poll which would take place after the meeting.

Mr. JONES proposed the re-election of Messrs. Allen Stoneham and J. J. Walker as Auditors.

The motion was seconded and carried unanimously, as was also a resolution sanctioning the disposal of such portions of the Company's property as were not now required for the undertaking.

A SHAREHOLDER then moved that a report of the proceedings should be sent to each shareholder.

The GOVERNOR said it was quite unnecessary to make this motion, because if it was the feeling of the meeting that it should be done, the Directors were perfectly willing to do it.

Extraordinary General Meeting.

The SECRETARY having read the notice convening the meeting,

The GOVERNOR said he now declared the meeting extraordinary, for the purpose mentioned in the notice; and he begged to propose that the Bill to enable the Company to raise additional moneys, and to purchase, take, and hold lands, and for altering the standard price of gas and redeeming capital, and for other purposes, be approved.

The DEPUTY-GOVERNOR seconded the motion, which was put and carried.

The SHAREHOLDER who had demanded the poll then stated that, having regard to the fact that the Directors had agreed to send out a report of the proceedings, he would withdraw his demand—considering that a large number of proxies had been sent in to the Board without the true state of the facts being known. No doubt on a future occasion things might be different.

The GOVERNOR said he had spent the best years of his life in the service of the Company; and he believed it had not suffered at his hands or those of the Directors, all of whom were large holders of stock. Every member of the Board had honestly and industriously devoted himself to the service of the shareholders and to the best of his ability; and in spite of the want of popularity and loss of friends, they had stuck to the ship, and would continue to do so so long as they had the shareholders' support. The Directors did not object to criticism—in fact, they welcomed it—but they did say they were behind the scenes, and knew how the thing was worked, and were consequently able to form a more just and reliable opinion on these questions than could be done by anyone at such a meeting as the present who had not studied the subject as many hours as the Directors had years.

A SHAREHOLDER remarked that dividends spoke loudest.

The GOVERNOR said this reminded him of an incident he once heard, where a Director was elected on the Board of the Great Eastern Railway Company. He was not an experienced man, his walk in life having been that of the milk trade; and the first speech he made at the Board meeting was: "My Lord, I represent the ordinary shareholders; and if I had my way, I would have a parrot bought and put up in a cage, and hung up in this here Board room, and I would have it taught to say: 'Dividend, dividend, dividend.'" But dividend was not everything.

COMMERCIAL GAS COMPANY.

Half-Yearly Report and Accounts.

The following is the report of the Directors of this Company for the six months ending Dec. 31 last, which, with the accounts for this period, will be presented at the meeting of the proprietors on the 19th inst.

The Directors submit the accounts for the half year ended Dec. 31, 1902. The revenue account shows a net profit for the half year of £64,572 18s. 4d.; making, with £4525 17s. 9d. brought forward, the sum of £69,098 16s. 1d. Deducting therefrom £6710 15s. for interest, there remains standing to the credit of the net revenue account a balance of £62,388 1s. 1d. available for dividend. The Directors recommend that dividends be declared at the rates of 5 per cent. per annum upon the 4 per cent. stock of the Company, and of 4¾ per cent. per annum upon the 3½ per cent. stock, both less income tax, payable on the 2nd of March; and that the difference between the declared dividends and the authorized amount divisible, having regard to the price charged for gas during the year, be carried to the reserve fund. The rates of dividend recommended are equivalent to those paid last October. The balance of the net revenue will be carried forward to the next half year. The Directors have resolved that a Bill in Parliament be promoted relating to the testing of the Company's gas. The Bill will be submitted for the approval of the proprietors at a special general meeting to be held immediately after the conclusion of the ordinary meeting. The Directors have reduced the price of gas from 2s. 8d. to 2s. 6d. per 1000 cubic feet as from the taking of the Christmas indices. The Directors announce with regret that Mr. H. E Jones, the Company's Engineer, has signified his desire to relinquish his office. A resolution will be proposed for the grant to him of a retiring allowance, in recognition of his valuable services, extending over a period of 34 years.

The accounts accompanying the report consist of the usual statements. They show that stock to the amount of £801,875 has been raised out of the total of £1,130,000 authorized; and that £271,875 has been borrowed out of £400,000 sanctioned. Under the Company's Act of last year, additional capital stock to the amount of £300,000, inclusive of premiums, and bearing 4 per cent. dividend with an initial price of 3s. 3d., was granted, together with £100,000 of loan capital at 3 per cent. The receipts on capital account amount, with premiums, to £1,127,753 8s. 10d.; and the expenditure to £1,154,457 13s. 6d.; making the amount spent in excess of receipts £26,704 4s. 8d. In the six months covered by the accounts, £8122 was spent on account of a new steamship; £2390 on additional buildings and plant; £2074 on mains, services, &c.; £807 on meters; £3435 on stoves; and £7844 on prepayment meters and fittings (less £2569 written off for depreciation) making a total of £24,674 13s. 5d. The reserve fund amounted on Dec. 31 to £23,773, and the insurance fund to £28,652.

REVENUE ACCOUNT.

Expenditure.

Manufacture of gas—			
Coals and oil, including dues, carriage, unloading, and trimming	£85,554 9 0		
Salaries of Engineer and officers at works	2,426 10 0		
Wages (carbonizing)	17,580 1 4		
Purification—including £3944 13s. 9d. for labour	7,950 10 6		
Repair and maintenance of works and plant, materials, and labour, less £707 7s. 1d. received for old materials	20,663 12 3		
		£134,175 3 1	
Profit sharing		1,758 5 0	
Distribution of gas—			
Salaries and wages of officers and rental clerks	£2,326 12 6		
Repair, maintenance, and renewal of mains and services, material, and labour	2,631 3 7		
Repair and renewal of meters	1,962 3 11		
" " " " stoves	2,682 6 4		
" " " " automatic meters and fittings	2,645 5 0		
Incandescent mantle maintenance, &c.	642 10 4		
		12,888 1 8	
Public lamps—lighting and repairing		2,484 5 0	
Rent, rates, and taxes		9,040 3 6	
Management—			
Directors' allowance	£1,250 0 0		
Company's auditors	75 0 0		
Salaries of Secretary, Accountant, and clerks	1,427 16 7		
Collectors' salaries and commission	1,621 18 9		
Automatic meter collection	660 6 4		
Stationery and printing	920 2 11		
General charges	717 13 3		
		6,672 17 10	
Bad debts		1,004 3 7	
Discounts and allowances		2,762 17 3	
Law and parliamentary charges		1,544 8 1	
Superannuations and allowances		291 4 1	
Official officers		84 3 9	
Total expenditure		£172,705 13 8	
Balance carried to net revenue account		64,572 18 4	
		£237,278 12 0	

Receipts.

Sale of gas—			
Common gas per meter at 2s. 8d. and 2s. 6d. per 1000 feet	£170,433 8 1		
Public lighting and under contracts, common gas	8,431 12 0		
		£178,865 0 1	
Rental—			
Meter	£2,770 11 6		
Stove	2,734 2 0		
Automatic meter and fittings	4,995 14 7		
Incandescent mantle maintenance	348 16 8		
		10,849 4 9	
Residual products—			
Coke, less £4096 8s. 3d. for labour	£27,142 13 5		
Breeze, less £602 15s. 4d. for labour	838 5 2		
Tar	10,500 15 6		
Ammoniacal liquor and sulphate of ammonia	8,861 7 6		
		47,343 1 7	
Miscellaneous receipts—			
Rent receivable	£197 15 7		
Transfer fees	23 10 0		
		221 5 7	
Total receipts		£237,278 12 0	

The following are the statements relating to the manufacturing operations of the Company in the half year:—

Statement of Coals and Oil.

Description.	In Store June 30, 1902.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store Dec. 31, 1902.
	Tons.	Tons. cwt.	Tons. cwt.	Tons.	Tons.
Common	34,523	100,041 18	98,229 18	539	35,796
Cannel	2,641	..	100 0	..	2,541
Total	37,164	100,041 18	98,329 18	539	38,337
Oil—gallons	216,513	1,259,817	1,319,172	..	157,158

Statement of Residual Products.

Description.	In Store June 30, 1902.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store Dec. 31, 1902.
Coke—tons	2,308	60,165	15,648	46,145	680
Breeze—tons	1,481	10,005	..	10,616	870
Tar—gallons	553,944	1,098,706	..	1,003,177	649,473
Ammoniacal liquor—butts	2,675	30,221	27,659	..	5,237
Sulphate of ammonia—tons	160	967	..	937	190

Statement of Gas Made, Sold, &c.

Quantity Made (meter register and estimated).	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,462,685	52,757	1,290,148	1,366,945	4,724

BRENTFORD GAS COMPANY.

Report and Accounts for the Past Half Year.

In the report to be presented at the half-yearly meeting of the above-named Company on the 20th inst., the Directors state that there was an increase to the extent of 5·85 per cent. in the sale of gas in the six months ending Dec. 31 last compared with the corresponding period of 1901. This they consider very satisfactory, as the increase for the latter half of that year amounted to 8·9 per cent.; being an advance of 15 per cent. on the six months ending December 1900. The accounts accompanying the report show that the revenue from the sale of gas was £148,551, compared with £140,330 in the corresponding six months of 1901; meter and stove rentals were £13,702, against £12,715; residuals produced £33,289, against £28,738; and the total receipts were £195,589, against £181,831. The expenditure on the manufacture of gas was £99,679, compared with £100,784 (coals and oil dropping from £78,201 to £74,864); distribution cost £22,679, against £20,928; management, £5032, against £4856; and the total expenses were £141,012, against £139,502. The balance carried to the profit and loss account is £54,577, whereas this time last year it was only £42,329. There is a sum of £85,727 available for distribution; and, as notified in the "JOURNAL" last week, the Directors recommend dividends at the rates of 5, 12, and 9 per cent. per annum. The works of the Company, under the supervision of Mr. James Husband, are in thoroughly efficient order. There were 75,076 tons of Newcastle coal, and "Solar" oil equivalent to 26,454 tons, used in the production of 1,082,073,000 cubic feet of gas, of which 1,006,178,000 cubic feet were sold and 1,022,178,000 cubic feet accounted for. The estimated quantities of residuals produced were: Coke, 46,991 tons; breeze, 5905 tons; tar, 800,651 gallons; and ammoniacal liquor, 19,861 butts.

CRYSTAL PALACE DISTRICT GAS COMPANY.

Half-Yearly Report and Accounts.

At the meeting of the above-named Company on Friday, the Directors will present a satisfactory report on the working of the undertaking in the six months ending Dec. 31 last; the only drawback being the high price of coal, which necessarily retards a further reduction in the price of gas. As readers are aware, the Directors have given notice of a Bill to enable them to purchase additional land adjoining the works, reduce the illuminating power and initial price of the gas, alter the mode of purifying, and for other purposes, including the change of the name of the Company. They conclude their report by expressing their appreciation of the good conduct and devotion to duty of the officers and workmen of all ranks, who, by the system of profit-sharing and shareholding, have a direct interest in the Company's welfare. They are nearly all shareholders, and hold stock of the value of £13,525, and also have on deposit with the Company, at interest, £3200, or a total of £16,725, averaging about £30 per man.

The accounts accompanying the report show that the capital was increased during the half year by the issue of £6375 of 5 per cent. debenture stock, which realized a premium of £2550; bringing up to £788,415 the total amount received up to the end of the past year. The expenditure was £5688—viz., £2033 on new mains and service-pipes, £1864 on new and additional meters, and £1220 on stoves; making a total to date of £769,476, and leaving an unspent balance of £18,939. The Directors point out in their report that nothing is charged to capital that can fairly be borne by revenue; thus keeping the expenditure as low as possible. The revenue from the sale of gas was £78,069; meter and stove rentals produced £4775; residual products, £23,692; and the total receipts were £106,545. The expenditure on the manufacture of gas was £66,360 (coal, oil, &c., costing £46,657, including labour); on distribution, £7306; and on management, £4162—the total expenditure being £83,445. The balance carried to the net revenue account is £23,099 17s. 2d. After meeting the charges for interest on debenture stock, &c., this is sufficient to allow of the payment of the same dividend as in the previous half year, and leave a surplus of £3423 4s., of which £119 15s. 10d., being divisible profit, may be carried to the reserve fund; and it is proposed to create an insurance fund, as authorized by the Company's Act, beginning with an appropriation of £3000. This will leave £303 8s. 2d. to be added to the balance to be carried forward, amounting to £1654 4s. The dividend to which the shareholders are entitled under the sliding-scale is at the rate of £5 7s. 6d. per cent. per annum. The Directors recommend the payment of a dividend at the rate of 5⅓, or £5 6s. 8d., per cent.; carrying the odd 10d. per cent. to the reserve fund. The statements relating to the working of the Company show that, under the supervision of the Engineer (Mr. S. Y. Shoubridge), 53,758 tons of coal, 342,490 gallons of gas oil, and 220 gallons of carburine were used in the production of 541,788,000 cubic feet of coal gas, and 123,109,000 cubic feet of oil gas—together, 664,897,000 cubic feet, of which 609,762,000 cubic feet were sold and 616,938,000 cubic feet accounted for. With regard to residuals, there were produced 645,096 cwt. of coke, 17,700 yards of breeze, 615,258 gallons of oil, and 10,859 butts of ammoniacal liquor; the make of sulphate of ammonia being 406 tons.

Carlisle Water Scheme.—Last Tuesday, the Geltsdale Water Committee of the Carlisle Corporation held a meeting at which they discussed the various points which had been raised in regard to the desirableness or otherwise of carrying out the Geltsdale water scheme at a cost of £243,000. The Town Clerk (Mr. A. H. Collingwood) submitted a draft case dealing with all the points in question; and it was agreed that it should be submitted to Mr. Balfour Browne, K.C., for his opinion.

PROVINCIAL GAS COMPANIES.

Meetings of gas companies are now being held in various parts of the country, and from the reports which reach us we extract the following points of interest to the general body of our readers.

Regenerator Furnaces at Dorchester.

In the six months ending the 31st of December, there was an increase of about 8 per cent. in the consumption of gas, compared with the corresponding period of 1901; and the net profit available for distribution is £1248. At the meeting to-day, the Directors will recommend the declaration of a dividend at the usual rate. The new regenerator furnaces were at work during the whole of the half year, with most satisfactory results.

The Kern Burner at Coatbridge.

At the meeting of the Coatbridge Gas Company last Friday, the Directors reported that the gross income in the half year ending Dec. 31 had been £12,545, or £467 19s. less than in the corresponding six months of 1891; but they explained that the price was 2s. 6d. now against 2s. 11d. then. There was, however, a sum of £3294 to be added to the balance for dividend purposes; and the rates proposed were 10 and 7 per cent. per annum. The use of gas for public lighting by Kern burners is growing rapidly; making the increase in the sales of gas over the corresponding half of the previous year 3,328,030 cubic feet—the total sales being nearly 65 millions for the six months.

Incandescent Lighting at Scarborough.

In the half-yearly report of the Scarborough Gas Company, the Directors remark that, owing to the indifferent season during the early portion of the six months ending Dec. 31, and to the large increase in the number of incandescent burners in use, whereby less gas was consumed to obtain a very much better light, the demand for gas was slightly less than that for the corresponding half of the preceding year—the decrease being 1·72 per cent.; but they express their pleasure at reporting that the consumption for the whole year showed an increase of 2·04 per cent. The amount available for distribution is £7716; and when the usual dividends have been paid, there will remain a balance of £1128.

Rapid Advances at Redhill.

The report of the Directors of this Company shows that the business continues to develop; the consumption of gas for the past year having been 109,622,000 cubic feet. This is an increase of 3,522,000 cubic feet, and is equal to 3·33 per cent. From the accounts, it is seen that, after payment of debenture interest, there is a balance of £7625 available for division, out of which the Directors recommend a dividend of 10 per cent. on the share capital, and 5 per cent. on the "B" stock, both less income-tax; leaving £1283 to be carried forward. An interim dividend of 4½ per cent. and 2¼ per cent. respectively, was paid on September last, which leaves 5½ and 2¾ per cent. to be paid. During the year, the Directors have placed £2000 4 per cent. debenture stock at £106, and sold by tender in April last £5000 ordinary "B" stock, at an average price of 101½.

A Comparison of Gas and Electric Lighting in York.

At the meeting of the York United Gas Company last Thursday, the Chairman (Mr. J. R. Hill) gave the shareholders a few figures bearing upon the cost of gas and electric lighting in the city. He stated that for the public lighting 168 gas-lamps had been discontinued and 66 electric arc lamps substituted for them, at an annual cost to the ratepayers of £1320. If the gas-lamps had been continued with incandescent burners, the annual cost to the city would, at present rates, have been only £622. The extra annual cost of the electric lamps was therefore £698. These figures he commended to the careful consideration of the Corporation. The Vice-Chairman (Mr. J. Melrose) confirmed what the Chairman had stated. He said he happened to be passing a shop in the city and saw there on one side 10 electric lights, and on the other 10 incandescent gas burners; and there was no question whatever as to the superiority of the latter. Further than this, he understood that the electric light cost the consumer about four times the amount he had to pay for the superior light of incandescent gas.

The Fitting of Mantles at Launceston.

Some of the shareholders of the Launceston Gas Company are indignant at the issue by the Directors of a circular stating that, owing to the difficulties experienced in getting mantles fitted to incandescent burners, they had decided to undertake the work. At the annual meeting of the Company last week, several speakers gave expression to this feeling. One gentleman said that, in taking this step, the Company were travelling outside their duties; and another remarked that he was sorry to see the Company trying to take the bread out of the mouths of the tradespeople in that little community. The Managing-Director (Mr. J. Treleaven) pointed out that it was for the convenience of the consumers that the Company drew up the circular in question. They did not want to get any profit by it; and their only object was to provide the best light at the lowest possible cost. Possibly some of the discontent of the shareholders was caused by the fact that the profit for the past year was somewhat less than that for the previous twelve months. This decrease, however, was accounted for by the further reduction made in the price of gas and by the high cost of coal, so that there does not seem to be any good reason for blaming the Directors in any way.

Electrical Competition at Grantham.

Referring, at the 57th half-yearly meeting of the Grantham Gas Company last Tuesday, to the advent of the electric light into the town, the Chairman (Mr. J. G. Thompson, J.P.) said that one firm used to consume 10 per cent. of the output of gas; and now that they had adopted the electric light, there was not sufficient difference for the shareholders in the Gas Company to notice it. They could supply a light

at a cheaper rate than electricity, and had lighted the streets of Grantham for over seventy years without a complaint. A deputation of the Town Council had been to the Isle of Wight at the expense of the Electric Light Company. But could they compare Grantham with the Isle of Wight? There were 3000 consumers of gas in Grantham; and it was for them to say whether or not the electric light should take the place of gas in the streets. The report showed a continued increase in the consumption of gas, both for lighting and heating purposes. The balance standing to the credit of the profit and loss account was £2524; and the Directors recommended that out of this sum £1875 be appropriated in the payment of a dividend at the rate of 5 per cent. per annum on the consolidated stock—leaving a balance of £649 to be carried forward.

Encouraging the Use of Gas in York.

The consumption of gas in York in the six months ending Dec. 31 last showed an increase of 0·75 per cent. on that of the corresponding period of 1901; the total being the largest recorded for the December half year in the history of the Company. The Directors regard this as eminently satisfactory, bearing in mind the economy of gas consumption resulting from the extending use of incandescent lighting, and the exceptionally mild weather prevailing in the last two months of the year, which affected gas consumption all over the country. With the view of further encouraging the use of gas for power purposes, the Directors decided to allow 10 per cent. off all accounts (cash payments) for gas consumed by engines. This allowance will make the price range from 1s. 8¾d. to 1s. 11½d. per 1000 cubic feet; and at the meeting of the Company last Thursday, the Chairman (Mr. J. R. Hill) had no hesitation in saying that if people who required motive power in their businesses would compare the cost of other sources of it with gas, they would find that the latter, at the Company's rates, came out at less than one-half. To still further extend the use of gas, the Directors have just arranged a scheme for supplying cooking-stoves, either on the hire-purchase or simple hire system, and fixing them free of cost; and in order to demonstrate the advantages to be derived from the system, and the facilities afforded by it, they have arranged to hold a gas exhibition next month. The amount available for distribution was £7663; and a dividend at the maximum rate of 4 per cent. per annum was declared—leaving a surplus of £725.

The Burden of Rates at Newport (Mon.).

The special feature of the speech of Mr. R. Laybourne, the Chairman of the Newport (Mon.) Gas Company, at the half-yearly general meeting on Monday last week, was a condemnation of the methods of the Corporation, in consequence of which there had been a continual advance in the rates of the town. As examples of this, he showed the difference between the amounts paid by the Company in 1892 compared with 1902. In the former year, the district rate for the half year was £252 odd; in the latter it was £480. The poor rate paid by the Company in 1892 was £171; in 1902 it was £525. The total rate paid by them in 1892 was £846; in 1902 it was £2010. He thought the proprietors would agree with him that this was a monstrous shame. With regard to their own working, in ten years there had been an increase to the extent of 57 per cent. in the consumption of gas, while the population had grown only 22 per cent., which meant that more gas had been consumed per head of the population. This increase was largely owing to the use of prepayment meters. They had now 6790 of these meters fixed, 8093 cookers, 2002 gas-fires, and 127 gas-engines. These figures showed that the use of gas for heating and cooking purposes had grown to an enormous extent, and gas-engines were acknowledged to be the cheapest power that small users could adopt. Mr. C. D. Phillips, referring to the Chairman's remarks on the Corporation's trading, said he thought it was really time the ratepayers spoke with no uncertain voice about the increasing rates and the opposition to various trades in the town. The accounts presented showed a sum of £6918 available for distribution; and the usual dividends were declared.

THE GASLIGHT AND COKE COMPANY'S BUSINESS METHODS.

The current number of the "Ironmonger" contains the following letter to the Editor by "A Would-be Consumer of Gas." It can be left to speak for itself, with the single suggestion that it might be read in conjunction with an article on "The Prevention of the Sale of Gas," which appeared in the "JOURNAL" for March 11, 1902 (p. 615): As the guardian of the retail ironmonger's interests, you very naturally often write with strong disfavour of the manner in which certain manufacturers and wholesale firms are occasionally willing to supply private customers directly. It is, however, only just to point out that some of these concerns accompany their offers with conditions which no business man would care to accept; and therefore the ironmonger ought to regard these firms rather as his allies than as his deadly enemies. For instance, I have been wanting a new gas-fire; and, though I am not a retail ironmonger myself, I am sufficiently confident in my knowledge of the subject to require a particular make, and a particular variety of that make. On inquiry—I must be forgiven for looking after my pocket in these days of high taxation—I find I am supposed to be able to purchase it from my local Gas Company (the Gaslight and Coke Company) at a discount considerably larger than that which I can obtain elsewhere. I therefore offer them the order, when, after two days' delay, I receive a printed form stating that if I will send a "Post Office order" for the amount, payable to Mr. So-and-so, crossed for a certain bank, and marked "a/c G. L. and C. Co.," if I will return the printed notice (which I contemplated putting in a frame), and if I will watch over the Company's interests by accepting only their engraved receipt (I think these are all the conditions), "the stove will be delivered (subject to the execution of orders already in hand) without delay." I cannot help considering this method of pretending to do business somewhat amusing; for, although the Company cannot be expected to know whether I am solvent, they do not make me pay for gas beforehand, and at the moment I probably owe them more for gas supplied than this particular stove is worth. Besides, I should like to see that I do get the stove I ordered; and, curiously enough, should prefer to save 2d. by paying by cheque. It seems to me that some of your trade-protection societies would only be acting courteously if they were to pass a vote of thanks to the Directors at Pall Mall—I mean Horseferry Road. More seriously, however, this is only a typical example of the Company's way of doing things; and it is amazing that the largest gas company in the world should have such antiquated and ridiculous notions of business. The value of their shares has fallen terribly of late years, mainly due, they say, to the competition of the electric light. As a source of artificial light, electricity has many undoubted advantages, and only its expense against it. But if, under the conditions now obtaining in the north of London, even incandescent coal gas should become much less important as an illuminant than it is at present, the change will be wrought, not so much by the merits of electricity as by the desire of the private consumer to have dealings with people who conduct their affairs more pleasantly and less vexatiously, and who do not worship so constantly in the temple of red tape.

COMPARATIVE COST OF PUBLIC LIGHTING SYSTEMS.

There ought to be no doubt existing in the minds to-day of the Newburn District Council (if they have reliance on the capacity of their Surveyor, Mr. Thomas Gregory, to advise them) as to the superiority of the incandescent gas-burner both in respect of efficiency and cost. He has reported to them as to the lighting of the district and the comparative cost of oil, gas, and electricity. At present, the area is illuminated by 255 gas-lamps and 59 oil-lamps. The charges which the Newcastle and Gateshead Gas Company make for gas is 2s. 3d. at Scotswood, 2s. 6d. at Newburn, Lemington, and Bell's Close, and 2s. 7d. at Throckley and Walbottle. The Newcastle and District Electric Lighting Company have agreed, if desired, to light the street-lamps at the rate of £2 12s. per annum for each 16-candle power lamp. The total yearly expenditure for lighting is £743 12s. 3d; all-night lighting all the year round on the present system would cost £1038 19s. 2d.; and all-night lighting all the year round by electricity would cost £900 2s 8d. The cheapest illuminant is oil, which cost £1 15s. per year, including 6s. for maintenance, for each 15 to 17 candle power lamp. Gas costs on an average £2 3s. 4d. per year, including 2s. 6d. for repairs, for each 12 to 14 candle power flat-flame and 60-candle power incandescent burner. Electric light, as stated, would cost £2 12s. per annum on the same basis for each 16 candle power lamp. The saving by using electricity is, Mr. Gregory points out, in wages and maintenance only. There is, he says, a great diversity of opinion as to the relative efficiency of the various kinds of lighting; but, from his own observation, he asserts that a 16-candle power incandescent electric light would be better and more satisfactory than the present oil-lamp, equal to, but no better than, the ordinary 5-feet gas-lamp, and a long way inferior to the incandescent gas-lamp at present fixed. As to the number of extra lamps required throughout the district, the Surveyor considers that 74 might be fixed. If these are lighted by electricity, and the existing 59 oil-lamps converted into electric lights, an addition would be made to the present lighting account of £246, assuming that the electric lights were lighted all night all the year round, and the other lamps remained as they were. The question has been referred to the Works Committee for consideration; but the facts that gas is cheaper than electricity, and that the Surveyor's opinion is that the incandescent electric lamps (costing more) are "a long way inferior" to the trial incandescent gas-lamp, should enable them to come to a speedy determination as to the most suitable form of lighting for the district.

REINSTATEMENT OF ROADS AFTER MAIN-LAYING.

Dispute between the Gaslight and Coke Company and the Westminster City Council—Damage to Mains by a Steam-Roller.

At a recent Meeting of the Westminster City Council, a letter was read from the Gaslight and Coke Company in regard to a decision of the Council that the schedule prices for relaying trenches would be increased by 10 per cent., and that in future the Council would require public companies to bear the cost of making good defects in the paving of the public way round the covers of their boxes and chambers. The Company intimated that they had placed the matter in the hands of their Solicitors, with a view to taking such action as might be advised. It was resolved that the Company should be informed that the proposed charges were inclusive of such further repairs to the roadway as were necessary in all cases, in addition to the first reinstatement after the trench had been filled.

A report from the Works, Sewers, and Highways Committee was presented, in which they set forth that they had considered a letter from Messrs. Bedford, Monier-Williams, and Robinson, the Solicitors to the Gaslight and Coke Company, stating that certain works which the Council had performed in connection with the reinstatement of the public way after the laying of pipes by the Company were not necessary, or such as they could be called upon to carry out or pay for. The Committee said they understood that the Company, and also the Contractors to the Postmaster-General, were in the habit of laying pipes under the kerb without removing it. The works had nevertheless necessitated the resetting of the kerb; and to the payment of the charge for this work the Company demurred. The City Engineer had reported to them that, on the 25th of August last, the Company took exception to paying a charge at the schedule rate of 3s. 6d. per superficial yard for concrete laid under the paving, and alleged that as old material was used again, some allowance should be made to them.

The charge was included in the account rendered to the Company for reinstatements; but they forwarded their cheque less the amount of the charge. With regard to the question of reinstating kerbstones above referred to, the Committee expressed the opinion that the works done by the City Engineer were necessary and proper. With respect to the failure of the Company to pay the Council's scheduled charge for concrete under the pavement, they had informed the Finance Committee that they did not see their way to agree to any reduction, and they had requested them to take the necessary steps to obtain payment in full. The report was adopted.

The same Committee reported that they had been informed that the Company had sent in an account amounting to £7 4s. 3d. for relaying their mains in certain streets; the repairs being alleged to have been rendered necessary through the use of the Council's steam-roller there in October and November. The City Engineer reported that the roller was at work in the streets about the period mentioned, and that the damage referred to might be consequent upon its use; but that in one of the streets the main was only 17 inches below the surface of the road, in another only 18 inches, and in a third only 13½ inches. After some discussion, the following motion was adopted: "That the Gas-light and Coke Company be informed that the Council are of opinion that gas-mains should be laid in such a position as to insure their safety from damage through the repair of the road; and that, considering the shallow depth at which their mains in the streets referred to are laid, and the fact that only a 10-ton steam-roller was used, the Council are unable to pay the account which has been rendered, or to accept any responsibility for the damage in question."

BURY (LANCS.) GAS-WORKS MANAGEMENT.

Increase in Mr. Simmonds's Salary.

The minutes of the Gas Committee which came up for consideration at the meeting of the Bury Town Council last Thursday—under the presidency of the MAYOR (Mr. R. D. Duxbury)—contained the following: "At a special meeting on Jan. 27, 1903, the Chairman intimated that the Gas Engineer had received an invitation from the Reading Gas Company to see them with a view to his engagement as their Engineer and Manager. A deputation from the Committee interviewed Mr. Simmonds, and afterwards communicated the result thereof to the Committee. Resolved that the Gas Engineer's salary be increased to £7·0 per annum, on the understanding that he does not apply for, or accept, another situation for a further term of three years from May 1 next."

Mr. FLETCHER, in moving the confirmation of the minutes, referred to what he described as the extraordinary circumstances which had arisen during the past few weeks. He spoke of the good reports which had been published as to the quality of the gas manufactured in Bury, and added that, as one result of those reports, the Gas Manager (Mr. Henry Simmonds) had received a communication from a Gas Company in a county which was most desirable for residential purposes. Mr. Simmonds at once telephoned to him (Mr. Fletcher); and the result was the resolution referred to in the minutes, which was unanimous on the part of the Committee. At the present time some very important extensions were proceeding at the gas-works; and the work would probably occupy three years. Mr. Simmonds had prepared all the plans for these extensions; and he was also his own Clerk of Works. In addition to this, through the efforts of Mr. Simmonds, and the profits from the gas-works, the town rates had been relieved to the extent of (at the very least) 3d. in the pound during the past three years.

Alderman SYKES: How?

Mr. FLETCHER: By the extra profits he has made through his energy and ability.

Alderman SYKES: I thought we passed a resolution fifteen years ago to keep the profits down—in fact, not to make a profit.

Mr. FLETCHER: Yes, that is so; but you cannot help making profit with a man like this.

Mr. SANDERSON moved that the recommendation be deleted. The Chairman, he said, had made an excellent speech; and the major portion of it was perfectly true. He did not think it was wise on their part to pay the ratepayers' money away in this way. There was no doubt Mr. Simmonds was a capable man; but there were plenty of other capable men. It had been said the Manager had prepared the plans for the extensions; therefore, if another man came in, he would have those plans to work upon. ("Shame, shame.") He had been handsomely paid for the work in the past.

Alderman SYKES regretted the position taken up by Mr. Sanderson, and then proceeded to point out how on a former occasion the Bury ratepayers were allowed to suffer through the cheeseparing policy of the Council in refusing an advance of salary to Mr. Woodward. Mr. Woodward left them to receive a salary of three times the amount he was being paid in Bury, and was now enjoying the confidence of an important Gas Company. Referring to Mr. Sanderson's remarks, Alderman Sykes said that no doubt that gentleman could manage the gas-works for one-third of the salary proposed to be paid to Mr. Simmonds; but, with all respect to Mr. Sanderson, he would not have this man's brains behind him. He did not say Mr. Sanderson had no brains; but he had not "gas brains."

Some further discussion having taken place,

Mr. FLETCHER replied. He contended that the £1800 extra earned during the past four years was chiefly due to the genius of the Gas Manager. During this period, the market value of coal had been over 5s. per ton more than the normal price of the four previous years; and it was through Mr. Simmonds's careful buying that they had not to pay 1s. per ton more for the coal during the last four years. They were in Bury manufacturing and putting gas into the holder at a less cost than any other works in Lancashire.

The minutes were thereupon put and confirmed with only one dissentient—Mr. Sanderson.

ELECTRIC LIGHTING NOTES.

Good Working in Liverpool.

In presenting a report to the Electric Power and Lighting Committee of the Liverpool Corporation, on the draft estimates for the current year, Mr. A. Bromley Holmes, M.Inst.C.E., City Electrical Engineer, states that the output of electrical energy for the year 1902 for lighting and power shows an increase of 17 per cent., and the output for tramways an increase of 15 per cent.; the demand for lighting, expressed as the equivalent in 16-candle power lamps, being 220,924 lamps, compared with 180,990 lamps in the previous year. The number and horse power of the electric motors supplied with energy was 827 motors, amounting to 2877-horse power compared with 587 motors, amounting to 2083-horse power. Since the Corporation acquired the undertaking in 1896, the increase in the demand for electric energy has grown from 1,452,511 to 23,186,083 units, of which 15,890,579 units were for tramways. The working costs per unit have been still further reduced to 0·9d. per unit. On the 1st of April last, the price for electric energy for lighting was reduced from a uniform rate of 4d. per unit to 3¾d. per unit up to 3000 units per quarter, and 3d. for each unit in excess of this amount; the prices for power and heating being 2d. per unit up to 3000 units per quarter, and 1½d. per unit beyond that limit. The prices charged when the undertaking was purchased by the Corporation in 1896 were 7½d. per unit for lighting, and 5d. per unit for power. The Engineer gives a table of comparisons, showing that Liverpool's output was the largest, and the working cost and average price per unit charged were the lowest in the kingdom during the past year.

Electric Lighting Finances in Islington.

The annual report of the Finance Committee of the Islington Borough Council, which has just been issued, is of unusual interest on account of the outspoken statement it contains with regard to the position of the electric light undertaking. The expenditure on public lighting has gone up in the past ten years from £14,645 to £33,314. This extraordinary increase, the Committee point out, is "due mainly to the introduction of electric arc lighting, and to some extent to increased gas lighting; but, as a matter of fact, even this latter figure, large as it is, does not actually represent the whole cost of street lighting." They go on to say: "The price of 3½d. per unit which is charged for current supplied to the public electric arc lamps is really under cost price, and, of course, means a distinct loss to the electricity undertaking—last year to the extent of no less than £4900. This means that, instead of showing at the end of the past financial year a deficiency of £524, the accounts of the undertaking would, had the electricity supplied for street lighting been charged at cost price, have shown a surplus of at least £4376, without taking into account previous years; and when it is remembered that up to the present time no provision has been made for depreciation in respect of the undertaking, the Council will understand the importance of this point from a strictly commercial aspect. The general rate, on the other hand, would have been increased by nearly ⅜d. in the pound." The Committee hope to present a report on this subject at an early date; but, in the meantime, they feel sure that the Council have no desire to "conceal the exact position by showing the cost of street lighting at a lower figure than is actually the case," and thus cause a deficiency in the accounts of the undertaking. They add that sooner or later provision must be made for depreciation, and they remind the Council that if there are no surplus profits this would ultimately have to be borne by the rates. They think it would be better, therefore, that the correct figures should be shown both in the expenditure on public lighting and correspondingly in the income of the undertaking.

Guernsey Water Supply.—The States Committee appointed to go thoroughly into the question of the water supply of Guernsey have been working steadily for the past few months. As the advice to be had on the island was considered to be inadequate for their guidance, the services of an expert—Mr. J. S. Beresford, late Inspector-General of Irrigation to the Indian Government—were requisitioned. He has visited the island, and has made a valuable report, which the Committee say would have been presented to the States before this, had it not been for his estimate of the cost of the scheme, particularly as regards the value of land. In the meantime, the Water Company have not been idle; for, being anxious to secure an adequate supply, the Directors have obtained advice from Mr. E. M. Eaton, M.Inst.C.E., who personally visited the island in order to be in a position to prepare a report. This has been made; but the contents have not yet been published. With advice from two such independent sources, the vexed question of providing Guernsey with an adequate supply of water should be settled without much delay.

Dungannon Water Supply.—A Local Government Board inquiry was held at Dungannon a few days ago in regard to an application by the Urban District Council for a loan of £1700 to enable them to carry out a scheme for the improvement of the water supply. Mr. J. H. H. Swiney, M.Inst.C.E., who has charge of the works, informed the Inspector (Mr. P. C. Cowan, M.Inst.C.E.), that he had been engaged in carrying out the original scheme in 1879. The catchment area was 240 acres, and the storage capacity of the principal reservoir was 13 million gallons. The main from the storage reservoir was a 7-inch. The service reservoir at Dungannon had a capacity of 800,000 gallons. The main pipe should carry 160,000 gallons per day; but it was only carrying 84,000 gallons. He proposed to remedy the deficiency by having the pipes scraped. His original improvement scheme had included the construction of filter-beds at an additional cost of £1400. The Council, however, had altered this by proposing to divert the intercepted streams, and discharge them immediately below the reservoir. This would cut off 40 acres from the catchment area, leaving 200 acres, which would be ample.

THE COST OF MUNICIPAL TRADING.

Discussion on Mr. Dixon H. Davies's Paper at the Society of Arts.

In the "JOURNAL" last week (p. 295) we gave extracts from the paper read by Mr. Dixon H. Davies on the above subject, at the Society of Arts, on the 28th ult., with observations thereon by the Lord Chief Justice (Lord Alverstone), who presided on the occasion. In the course of the remarks by subsequent speakers, reference was made to municipal as compared with company control of gas undertakings; and these are briefly noticed below.

Mr. J. R. COUSINS, a member of the London County Council, said it had always struck him that the difficulty, in dealing with a question like the one before their meeting, was to divide the objects under heads which could be proved by returns for the municipalities, because these were so incomplete that it was difficult to make a statement applicable all round. Taking, however, two towns like Manchester and Liverpool, which were very nearly the same size, in Liverpool the gas was supplied by a private Company and in Manchester by the Corporation. The advocates of municipal trading said that in Manchester there was a profit on the gas of upwards of £50,000 a year; and they quoted this as a strong illustration of the advantages of municipal trading. But that £50,000 profit had only been kept up by increasing the price of gas 3d. per 1000 cubic feet in 1900 and again in the following year. The ratepayers of Manchester had, therefore, paid 6d. per 1000 cubic feet extra for their gas in the last two years, in order that the Corporation might still be able to continue to say they made £50,000 a year profit on the gas. Those who were concerned in municipal management must look at the question not so much from the point of view of whether municipal trading paid or not, as whether it was right for a municipality to enter into that particular field. There was a limit to the amount of work which a man could do upon a public body; and if there were added to the burdens of that body functions of a special kind which required special training, it was exceedingly difficult to find the right men to fulfil those requirements, and it put an excessive burden upon them individually, which prevented them giving proper attention to the necessary matters connected with sanitation, which were their chief functions. The important question was not so much whether municipal trading paid, but whether the municipality were not damaged financially and morally, and made less capable of fulfilling their proper functions, by being encouraged to enter the field of competition with private enterprise. The rates might enable them for a time to compete; but he was convinced that ultimately there would be diminished profits. A heavy debt would accumulate on their shoulders, and the corporation would have a concern on their hands which would not pay, and would have to be sold to the highest bidder.

Mr. J. R. MACDONALD, another member of the Council, referring to the statement of Mr. Cousins as to how the Manchester Corporation made £50,000 a year on their gas undertaking, said he believed that even now the price of gas in Manchester was lower than it was in Liverpool.

Mr. COUSINS said that in Liverpool, under a private Company, the price was 2s. 8d. per 1000 cubic feet; while in Manchester, under the Corporation, it was 2s. 9d.

Mr. MACDONALD said it therefore appeared that, although in Manchester the price had been raised by 6d. in two years, there was only a difference of 1d. per 1000 cubic feet between Manchester and Liverpool at the present time. But before an estimate of the value of the figures given could be made, and a real meaning be attached to them, more information was required on many points, including the cost of coal. No man who had seriously faced the question as a practical administrator would say that in every case municipal enterprise would compare favourably with a private enterprise in a town some miles away. The author should have compared the charges for gas by the Gaslight and Coke and the South Metropolitan Gas Companies. The paper was bristling with statements which had no relation to each other, and with statistics that did not explain themselves. Those interested should approach the problem as careful statisticians, and try to give some value and meaning to figures, and not be content with adding up meaningless totals and throwing at people's heads meaningless assumptions.

Major-General WEBBER asked the members of the London County Council who was responsible for a clause in a Bill now before Parliament in regard to general powers for electric lighting in London, which enabled the Council to buy at wholesale prices electric light fittings costing three-quarters of a farthing and a farthing apiece, and 1s. 6d. and 1s. 3d. per dozen, and sell them retail to those who wished to have their houses fitted up for electric light. No doubt it admitted of a full explanation, but it was a class of trade he should have thought the Council would not have initiated. Having served for many years on a Valuation Committee of one of the local authorities in London, he thought the author had not made out nearly so strong a case as he might have done. The tendency of all Valuation Committees was to keep valuations down when there was no municipal trading, but to keep them up whenever this became the order of the day. There was one fundamental question behind the whole subject—viz., what was a day's work of a man—what was the amount of work which a man, in his particular trade, ought to give to his employer? He had superintended, both at home and abroad, work done by contract and on the principle of the Works Department of the London County Council, and the success of either process depended upon the amount of work the employer obtained from the man employed. If they could get men to see that a good day's work was entitled to a good day's wage, the whole of the present extra cost of building, taking into consideration labour-saving appliances, would come down per cubic foot to the price it was fifty years ago. It was the "go easy" day's work, which had

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 343.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 15	10½	Alliance & Dublin 10 p.c.	18½—19½	+½	5 7 8
100,000	10	,,	7½	Do. 7 p.c.	12½—13½	..	5 11 1
200,000	5	Nov. 13	6½	Bombay, Ltd.	5½—6½	..	5 4 0
40,000	5	,,	6½	Do. New, £4 paid	4¼—4¾	..	5 9 5
380,000	Stk.	Aug. 14	12	Brentford Consolidated	247—252	..	4 15 3
286,700	,,	,,	9	Do. New	182—187	..	4 16 3
50,000	,,	,,	5	Do. 5 p.c. Pref.	136—141	..	3 10 11
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	110—113	..	3 10 10
220,000	Stk.	Sept. 11	10⅝	Brighton & Hove Orig.	209—214	..	5 0 4
246,320	,,	,,	7⅝	Do. A. Ord. Stk.	155—160	..	4 16 11
460,000	20	Sept. 26	10	British.	39½—40½	..	4 18 9
50,000	10	Aug. 14	12	Bromley, Ord. 10 p.c.	—	..	—
82,850	10	,,	9	Do. 7 p.c.	—	..	—
500,000	10	Oct 15	7	Buenos Ayres (New) Ltd.	10¼—10⅜	..	6 10 3
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	92—94	..	4 5 1
150,000	20	July 11	8½	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 26	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	53—55	..	5 9 1
1,375,000	Stk.	—	5†	Commercial 4 p.c. Stk.	106—109	..	4 11 9
503,750	,,	—	4⅜†	Do. 3½ p.c. ,,	101—101½	..	4 11 4
407,812	,,	—	3	Do. 3 p.c. Deb.,,	90—93	..	3 4 6
800,000	Stk.	Dec. 11	8	Continental Union, Ltd.	125—130	−3	6 3 1
200,000	,,	,,	7	Do. 7 p.c. Pref.	140—145	..	4 16 7
575,000	Stk.	Aug. 28	5⅛	Crystal Palace Ord. 5 p.c.	117—122	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—125	..	4 0 0
106,158	,,	Jan. 15	5	Do. 5 p.c. Deb. Stk.	137—140*	..	3 11 5
486,090	10	Jan. 29	10½	European, Ltd.	17½—18¾*	..	5 13 6
354,060	10	,,	10½	Do. £7 10s. paid	13—14*	..	5 12 6
15,243,200	Stk.	Aug. 14	4 1/10†	Gas-light and Coke	4 p.c. Ord.	85—87	−2	5 1 2
2,600,000	,,	,,	3½		3½ p.c. max.	88—90	..	3 17 9
3,799,735	,,	,,	4		4 p.c. Con. Pref.	108—111	..	3 12 1
4,193,975	,,	Dec. 11	3		3 p.c. Con. Deb.	91—93	..	3 4 6
232,500	Stk.	Sept. 11	5	Hastings & St. L. 3½ p.c.		90—95	..	5 5 3
70,000	10	Oct. 30	8	Hongkong & China, Ltd.		14½—15½	..	5 3 3
3,800,000	Stk.	Nov. 13	10	Imperial Continental		206—209	..	4 15 8
473,600	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.		99—101	..	3 9 4
158,242	Stk.	Aug. 28	6	Lea Bridge Ord. 5 p.c.		115—120	..	5 0 0
561,000	Stk.	Aug. 28	10	Liverpool United A		224—226	..	4 8 6
718,100	,,	,,	7	Do. do. B		165—167	..	4 3 10
306,083	,,	Dec. 31	4	Do. do. Deb. Stk.		114—116	..	3 9 0
75,000	5	Dec. 11	5	Malta & Medn., Ltd.		4—4½	..	5 11 1
560,000	100	Oct. 1	5	Met. of Melbourne	5 p.c. Deb.	105—109	..	4 11 9
250,000	100	,,	4½		4½ p.c. Deb.	103—105	..	4 5 9
541,920	20	Nov. 13	3½	Monte Video, Ltd.		9½—10½	..	6 13 4
1,515,892	Stk.	Aug. 8	4½	Newc'tle & G'tesh'd Con.		104½—105½	..	4 5 4
346,855	Stk.	Jan. 2	3½	Do. 3½ p.c. Deb.		97—98	..	3 11 5
300,000	Stk.	Nov. 27	8	Oriental, Ltd.		143—148	..	5 8 1
600,000	5	Sept. 26	7	Ottoman, Ltd.		6—7	−⅛	5 0 0

* Ex. div.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
105,005	Stk.	Jan. 15	6⅛	Ply'mth & St'house 5 p.c	123—128*	..	4 15 9
851,070	10	Oct. 15	7	River Plate Ord.	10½—11	..	6 7 3
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	93—95	..	4 4 3
250,000	10	Sept. 26	8	San Paulo, Ltd.	11⅝—12⅝	..	6 8 0
135,000	Stk.	Sept. 11	10	Sheffield A	236—238	..	4 4 0
209,984	,,	,,	10	Do. B	234—236	+1	4 4 9
523,498	,,	,,	10	Do. C	233—235	..	4 5 1
103,235	Stk.	Sept. 26	5	Shrewsbury Ord. 5 p.c.	113—116	..	4 6 2
6,000,000	Stk.	Aug. 14	5⅜	South Met., 4 p.c. Ord.	122—124	..	4 6 0
1,780,000	,,	Jan. 15	3	Do. 3 p.c. Deb.	91—93*	..	3 4 6
380,940	Stk.	Nov. 13	5	Southampton Ord.	103—107	..	4 13 6
87,950	,,	Jan. 15	4	Do. 4 p.c. Deb.	100—103*	..	3 17 8
120,000	Stk.	Aug. 28	6	Tottenham and Edmonton	A. 5 p.c.	118—123	..	4 17 7
300,520	,,	,,	4⅜		B. 3½ p.c.	93—96	..	4 13 9
182,380	10	Dec. 30	5	Tuscan, Ltd.		8⅝—9⅛	..	5 5 3
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.		94—96	..	5 4 2
230,000	5	Aug. 14	9⅛	West Ham, 10 p.c.		—	..	—
172,000	10	,,	6⅛	Do. 7 p.c.		—	..	—
				WATER COMPANIES.			
780,662	Stk.	Dec. 30	11⅛	Chelsea, Ord.		315—325	..	3 10 9
150,000	,,	,,	5	Do. 5 p.c. Pref.		150—155	..	3 4 6
160,000	,,	,,	4⅛	Do. 4½ p.c. Pref. '75		138—143	..	3 2 11
175,785	,,	Sept. 26	4⅛	Do. 4½ p.c. Deb.		140—145	..	3 2 1
1,720,560	Stk.	Oct. 15	8	East London, Ord.		228—233	..	3 8 9
654,740	,,	Dec. 11	4⅛	Do. 4½ p.c. Deb.		142—147	..	3 1 3
1,282,943	,,	,,	3	Do. 3 p.c. Deb.		97—99	..	3 0 7
700,000	50	Dec. 11	8	Grand Junction	10 p.c. max.	117—122	+2	3 5 7
310,000	Stk.	Sept. 26	4		4 p.c. Deb.	125—130	..	3 1 7
708,000	Stk.	Aug. 14	14	Kent		305—315	..	4 8 11
160,000	,,	,,	7	Do. New, 7 p.c. max.		200—210	..	3 6 8
1,043,800	100	Dec. 30	11	Lambeth, 10 p.c. max.		305—315	..	3 9 10
406,200	100	,,	8⅛	Do. 7⅛ p.c. max.		220—230	..	3 13 11
350,000	Stk.	Sept. 26	4	Do. 4 p.c. Deb.		125—130	..	3 1 7
500,000	100	Aug. 14	12½	New River, New Shares		395—405	..	3 3 2
1,000,000	Stk.	Jan. 29	4	Do. 4 p.c. Deb.		125—130*	..	3 1 7
902,300	Stk.	Dec. 11	7	South-wark and Vauxhall	Ord.	207—212	..	3 6 0
126 500	100	,,	7		7½ p.c. max.	200—210	..	3 6 8
489,200	Stk.	,,	5		5 p.c. Pref.	151—154	..	3 4 11
1,019,585	,,	Oct. 15	4		4 p.c. A Deb.	125—130	..	3 1 7
1,155,066	Stk.	Dec. 11	10	West Middlesex		295—305	..	3 5 7
200,000	,,	,,	4⅛	Do. 4½ p.c. Deb.		140—145	..	3 2 1
200,000	,,	Sept. 11	3	Do. 3 p.c. Deb.		97—99	..	3 0 7

* Ex. div.

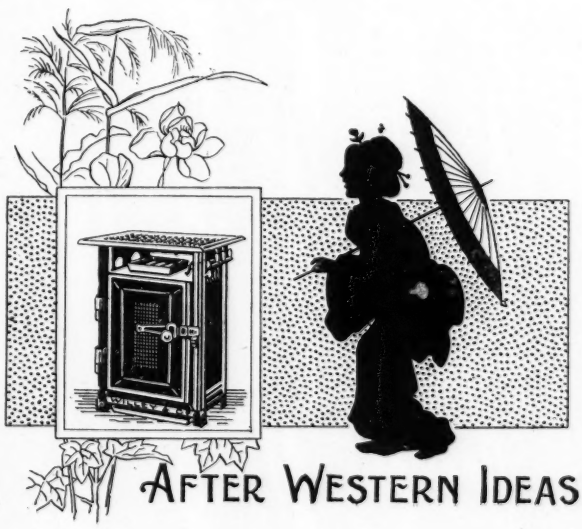
been instilled into the minds of a large number of the excellent artisans of this country, which was responsible for the mischief. He hoped the whole question would be scientifically worked out.

Mr. T. Dundas Pillans disavowed, on his own behalf and on behalf of those who held the views of the author, that they were actuated by any hostility towards the municipalities. The position he took up was that municipalities would be much better employed, and would perform their functions much more efficiently and satisfactorily, if they restricted themselves to their legitimate functions, and left to the proper people those trading enterprises which depended largely for their success upon the motive of self-interest, and which could be best conducted by those who had a personal interest in them. Six years' experience had convinced him that it was impossible for a municipality to successfully conduct trading enterprises, because the motive of self-interest was absent; and the individuals who conducted them had no direct personal incentive to make them a success. He thought municipal industrial enterprise must fail, because the gentlemen who were elected to town councils were, in the main, not chosen because they were fit and proper persons to undertake industrial enterprise or commercial transactions, but for entirely different reasons. Mr. Macdonald had said it was unfair to institute comparisons between one city and another, and to say that one town succeeded in a certain industrial enterprise where another town failed; and he referred to the two largest Gas Companies in London. The South Metropolitan Company had been successful because of its Chairman, who had done so much for the working classes, and had succeeded in emancipating himself from the tyranny of the Trade Unions; and it was because the Gaslight and Coke Company were subjected to the very influences which he suggested would be dominant in the town councils that that Company was a comparative failure, and the other a triumphant success. He submitted that the author's figures had passed practically unchallenged, and that he had proved the points he had put forward. He (the speaker) supported the suggestion that a Royal Commission should be appointed to inquire thoroughly into the question, so that if the people of the country did go in for municipal trading, they would do so with open eyes.

Sir F. Bramwell, Bart., said he wished to re-ventilate a very old grievance. In 1870, the Tramways Act and a General Act were passed. Under the latter, after 21 years, the municipalities might purchase the undertakings compulsorily. But they could not work the tramways, and had to lease them. Later on, the Electric Lighting Act was passed, in which were embodied the provisions of the Tramways Act as to the powers of the municipalities to acquire; but they were no longer restricted from working. The Act further stated that if a municipality did not like to purchase at the end of 21 years, at the expiration of another seven years the option might be renewed; and so on, from seven years to seven years. Putting it in plain English, it meant that, so long as the undertaking did not pay, the municipality were not bound to buy it; but directly it did, they were entitled to take it. He and others did all they could to prevent anybody starting under the terms of that Act; and after a period of six years, they managed to get the term extended to 42 instead of 21 years. In the meantime, the United States and Germany went to work and prospered in their business of machine making, with the result that at the present day England had lost for ever the manufacture of electrical machinery. As the Chairman of an Electric Lighting Company in London, he had also to state that the whole of the equipment for a new generating station which had been erected, with the exception of the engines and boilers, came from abroad, because they knew it would be good, both in manufacturing details and scientifically, and they knew the promise could be relied upon as to when it would be delivered. It was to him a matter of the deepest regret to think that, from the desire to pander to municipal trading, which caused the Act to be passed, England had, he believed, for ever lost her proper position in the manufacture and supply of electrical machinery.

The discussion was adjourned till last Friday. On its resumption,

Mr. Sydney Morse said that, so far as he had been able to ascertain, the great point put forward in favour of municipal trading was this: That traders made a profit, and why should not those profits be retained by the municipalities, instead of allowing them to go into the pockets of shareholders? The object was to get larger sums of money for expenditure by the local authority for their various purposes. In pursuance of that object, local authorities had taken up certain trades, but they said they only touched those trades which were a necessity for all. They urged that, as they were representatives of "all," anything wanted by "all" was properly provided by the municipality, and the profits were rightly distributed among the ratepayers. In applying this rule, it was an unfortunate thing that they entered upon such an undertaking as electric lighting. For illustration, he referred to Salford. There they had 35,000 ratepayers. An electric light undertaking had been installed, and large sums of money had been spent on capital account, with the result that, out of 35,000 ratepayers, they had secured 401 consumers! How could it be said, in view of this, that electric lighting was a thing required by everybody? The financial result was astonishing. In 1900, there was a loss of £2028; in 1901, a loss of £7489; and last year, a loss of £13,214. So that Salford, to keep in its own pockets the "profits" for the ratepayers, had lost in three years £23,000, in order that 401 of the 35,000 ratepayers should have electric light. He ventured to think that, if these 401 people had supplied themselves with the electricity they required, they would have done it at much less loss. In order to ascertain what was the real result of municipal trading, the writer on the subject in the "Times" had made an inquiry into the point whether or not those local authorities who had embarked in these "reproductive" undertakings had lowered the rates. He took 35 cases generally throughout the country; and in only three could it possibly be said there had been a reduction of the rates. This seemed to him (Mr. Morse) to be pretty conclusive evidence—at any rate, at present—that the point for which municipalities set out had not been reached. He ventured to think it was not merely a question of whether a local authority did or



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did not make a profit; the question was one of broad principle—of right or wrong, and not a mere question of finance. He commented on the practice of employing the borough officials in several departments, and not charging some of those departments with their proportion of the expense—instancing an electric light undertaking, the gross income of which was shown as £10,000, but nothing was charged for official services the first and second year, and only the magnificent sum of £50 the third year. He cited the Colney Hatch "temporary" buildings, and the Queen Victoria Street fire, as evidence of inefficiency, and proof that the energies of those who formed the London County Council were detached from what should be their ordinary duties by those which could be done as well by private people. In considering the possibility of a remedy, he was faced by this difficulty, that if it was right and proper that a municipality should trade in any one commodity, how could it be said the argument did not apply to every other commodity? If it applied to coal, why not to food and clothes? What, then, was the remedy? Cobden had said: "If we have entered on a false system in this respect, we ought to retrace our steps." And in his (Mr. Morse's) view, there was no other remedy than the absolute prohibition of municipal trading in the future. Municipalities themselves could do much good for their districts, and help to get rid of this awkward question, by adopting this attitude towards private enterprise: "We welcome you; but you must not take out of our people more than a reasonable dividend, and you must give them a good article." If that was their position, it would inure much more to the benefit of the community, and be very much better in the result, than any amount of municipal trading.

Mr. Ewing Matheson dealt with the fallacy of the argument that the private shareholder asked for a dividend of 4 or 5 per cent., while municipalities claimed they could borrow at 3 per cent. They had, however, been borrowing so much lately, that they could not now get money at 3 per cent.; and he did not know where it was going to stop. He knew of a city in the North, where twenty years ago the local authority built a large reservoir at a very cheap rate. When completed, as fast as water was sent in, it ran out at the bottom. Seventeen years after, they succeeded in remedying that state of things, at a cost of an extra £100,000. The whole of this sum had to be borne by the municipality. They had to borrow it; and the interest had to be paid by the ratepayers. Now if a company had been so unwise as to build that reservoir "on the cheap," they would have had to bear the expense of that £100,000. He also spoke of municipal officials seeking to carry out large works that would add to their emoluments. He believed if inquiry was made, it would be found that the interest paid to shareholders was no more—in fact, he believed it was less—than the interest and obligations that had to be borne by municipalities.

Mr. Walter Bond likened municipal trading to a company in which the Directors were not elected by the shareholders, but by their salaried officials. The shareholders were not voluntary ones taking upon themselves speculation, but they were obliged to be shareholders, and to pay money in order to deprive themselves of means of livelihood. Gas companies and tramway companies, for example, had to contribute to competition with themselves; and this seemed to him to be very much like comic opera.

Colonel Wilson and Mr. H. Springfield (a working man) also spoke—the latter emphatically asserting that behind this discussion were the capitalists. The policy which those present were there to condemn was being carried out by the various authorities throughout the country in response to "the acquiescence" of the great bulk of the electorate, of which he was a representative. What they proposed was that the margin which at present went to the capitalist in the shape of profit should be secured by their local bodies for the people—first, in order to better the condition of his own class, and, secondly, to give more efficient service to the general body of consumers. The local authorities could carry on these various industries advantageously to the latter, and could give to his class better wages and shorter hours of labour.

Mr. Campbell Swinton, in the course of his remarks, made a curious revelation. He said that the Association of Municipal Corporations had been mentioned in the course of the discussion. That Association was a big log-rolling arrangement, which was instituted by a firm of parliamentary agents, with 33⅓ per cent. commission to clerks who brought business to them. There was the Association of Urban District Councils who did the same, and that was also instituted by another firm of parliamentary agents. He thought the public ought to be made aware of these things. He had already brought to the notice of the Committee of both Houses of Parliament who sat to consider this question, the subject of commissions given by parliamentary agents; and they were much interested in it. The Committee asked Lord Morley whether he was aware of this; and he said he was, but it was wrong in principle. He (Mr. Swinton) did not say it was immoral, but it was most inexpedient that clerks of councils should be interested in promoting and opposing Bills to the extent of 33⅓ per cent. of the fees paid to the parliamentary agents. Municipal trading was largely run for the benefit of certain people.

Mr. F. Debenham spoke on the other side. In his opinion, although the "experiments" that were being made by municipalities might not have succeeded here and there, in the long run they would arrive at the right methods for continuing the various municipal enterprises. The question of municipal trading was not so much one of principle as expediency. Unless they proceeded on the inductive principle of experiment, how were they going to arrive at the best methods?

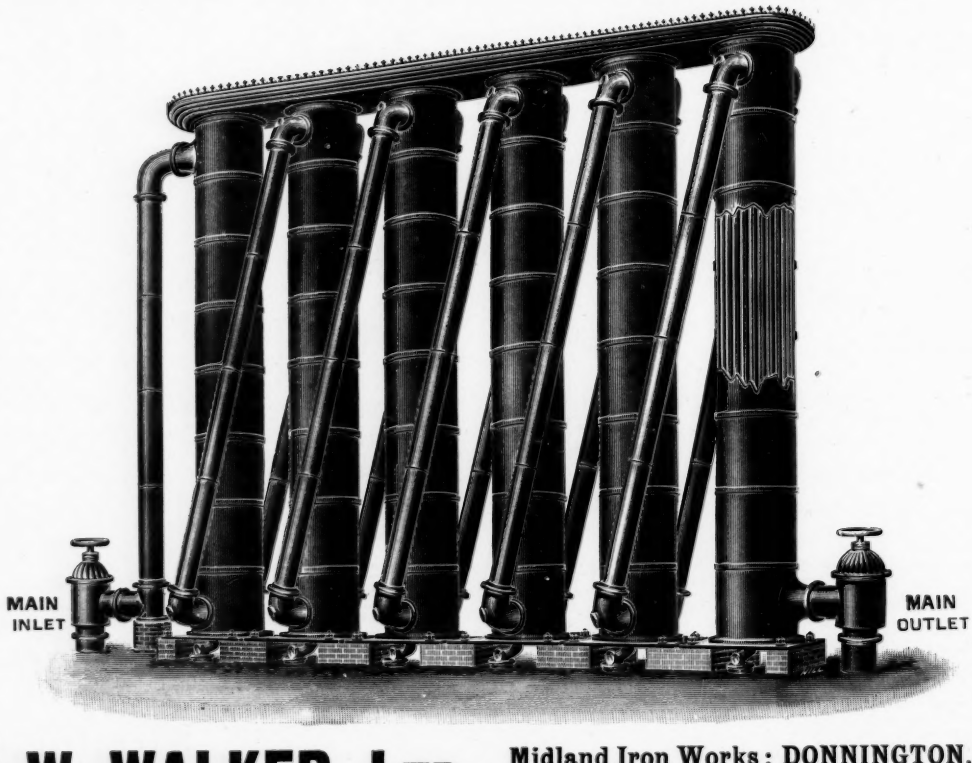
Mr. J. H. Buxton was of opinion that municipal trading enterprise had been justified over and over again; and he maintained that the great improvement that had taken place in the conditions of our towns was attributable to the local authorities.

Mr. C. H. Dade submitted the proposition that municipalities should be allowed to undertake the supply of any commodity or service which, in the interests of the whole community, every member should be compelled to use. (Laughter.)

Mr. D. M. Knowles proposed as a broad general principle that the line for municipal trading should be drawn at those undertakings which

CONDENSERS.

WATER COOLING.



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were in the nature of natural monopolies, and which were not open for further private invention and enterprise—such, for example as water, markets, and cemeteries. Electric lighting could not be placed in that category; seeing that it offered very wide scope for invention and private enterprise. It was an industry which, to justify and develop itself, must have the stimulating influence of competition; and local authorities were not prone to stimulate invention or enterprise.

Mr. HAROLD BROWN remarked upon the important difference between private enterprise and municipal trading that, whereas in the former the directors had to have pecuniary interest in the concern they were conducting, in the latter there was not that safeguard. It was never "too late" to stop on a wrong course; and, if in this municipal trading they were on a wrong course, then they ought to stop at once.

Mr. DAVIES, in responding to the discussion (which, on this occasion, continued nearly two hours), alluded to the contention that the functions of municipal authorities should be confined by some principle, and said he must confess he did not think such a thing was practicable. He did not believe they could draw up any formula which would stand the continual attacks of those interested persons who were always desiring to enlarge the functions of officials. He regarded favourably the simple American law which provided that the indebtedness of any town or city should not exceed a relative proportion of the rateable value of the property. He had taken the trouble to apply this principle of legitimate indebtedness to almost every local authority in the country; and there was not a single council who could not abundantly meet the whole of the needs of its sanitation, and the needs of the place other than trade undertakings, within the limit imposed in the United States. If they could apply a restriction of the purse strings in this way, they would put a check upon this bureaucratic adventure. Mr. Debenham admitted that municipalities were conducting great experiments. Experiments were very good things; but he objected to experiments made *in corpore vili* when he was the *corpus*. (Laughter.) It seemed to him they, as ratepayers, were very much at the mercy of the experimenters; and he did not see why they should be, because all these experiments could be carried on by those who were ready to embark their money in adventure. He contested the suggestion that all the improvements in urban life were due to municipal action. Take the single case of water. London would be dipping its buckets in the Thames and Lea to-day if they had waited for the local authorities to be the first to move. Water was the first step in sanitation; and in almost every case the supply had been started by private enterprise.

The LORD CHIEF JUSTICE (who presided) said he had received anonymous communications with reference to his remarks on the last occasion, and motives of the lowest character had been imputed to him in having then taken the chair. [Beyond the bare mention of these matters, his Lordship refrained from dealing with them.]

Municipal Trading in Relation to Gas and Electricity Works.

Mr. J. A. Bellamy, the Chairman of the Plymouth and Stonehouse Gas Company, gave an address at Plymouth on Tuesday last, on the subject of municipal trading. In the course of it, he said that the theory of the advocates of municipal trading was that undertakings which gave a monopoly ought to be worked by the municipality; and in this connection gas was always mentioned. In what sense, he would ask, was gas a monopoly to-day? Instead of its monopolizing the lighting, heating, and motive power supplies in towns, it was engaged in a great struggle with electricity, which was capable of supplying, and was allowed to supply, the same wants in the same towns. What, then, became of the monopoly theory? Then it was said that no one but the corporation should have the right to interfere with the streets. This also was a plausible, but unsound, argument, because a municipality, before consenting to powers being given to a private undertaking, might make any condition it chose as to the streets, and could even insist on doing the work itself; being repaid the cost by the private undertaking. It was a curious fact that in towns so close together as Devonport and Plymouth there was a great contrast in policy as to gas, electricity, and tramway undertakings. In Devonport, the gas up to a recent date was in the hands of a private Company; electrical works had been put up by the Corporation; and the tramways were worked by private enterprise, though the permanent way was under the control of the Corporation, who received a rental from the Company. In Plymouth, the gas undertaking was in private hands, while the Municipality worked the electricity and tramway undertakings. His opinion was that, as to the tramways, the policy pursued in Devonport was likely to be the most beneficial to the ratepayers. In any case, they ran no risk; and the service would more probably be better conducted than in Plymouth, where it was managed by gentlemen whose business was not tramway administration. Why the Devonport Municipality, being the owners of the electrical works, should have bought up the antiquated gas undertaking was difficult to understand. He thought a wiser course would have been pursued by asking Parliament to impose the sliding-scale upon the Gas Company. The effect of this would have been precisely what was intended in the case of the tramway undertaking. A fair interest on the capital would have been allowed to the shareholders, and most of the surplus profits would have gone to the ratepayers. Up to the time of the purchase of the gas-works by the Corporation, the sliding-scale had not been adopted by the Devonport Gas Company. In Plymouth, it had been in operation since the year 1879. The standard price was 2s. 6d., and the selling price 1s. 9d. per 1000 cubic feet. This difference of 9d. on an annual sale of 900 millions amounted to £33,750. Of this sum, the Company were only allowed to appropriate £3750—the balance going to the consumers; and as practically all these were ratepayers, the Company were to-day handing over the sum of £30,000 a year in aid of rates. What was more, the ratepayers really got the money. They were not in the position of people in some towns, where the Municipality owned the gas undertaking, and the profits, when made, were swallowed up to make good the losses in other directions. Mr. Bellamy went on to condemn the ambitious aspirations of town councillors to play at "shopkeeping" without risk to their own pockets, and particularly referred to a proposal to construct a wharf for landing coal for the electricity station, but which some members wished to enlarge into a trading wharf to compete with

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private undertakings. A more fatal attack upon private enterprise could not, he said, be imagined. It would not bring more trade to the port, but would simply injure the private trader, put a check upon enterprise, and rob those who paid the rates. This kind of Socialism was a danger to the working classes as well as to the middle and upper classes; and it could only be checked by the election to public bodies of men of capacity and position. A combined and intelligent resistance should be offered to every proposal which tended to increase direct employment by the Corporation when the work could be done by private enterprise; to all schemes of municipal trading as opposed to private trading, when the latter was at hand and available; to the concealment of the true financial results of any undertaking, such as the absence of a depreciation fund where, as business men, they knew such a fund should be provided; and to the rapid piling up of debt without regard to the future. Above everything else, a sound and honest financial administration should be insisted upon.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Corporation of Dundee are easily touched in a susceptible part when a proposal to spend money is made. The other day the Gas Committee resolved to recommend that the salary of Mr. S. Donald, the Assistant Gas Manager, should be increased by £50, making it £225 a year. This is not a large additional burden upon an undertaking whose annual income amounts to £115,000, yet the proposal was attacked, on the ground of economy. Mr. Mechan, who explained that he did not know Mr. Donald, and was, therefore, not proceeding upon personal motives, but upon principle, said that he objected to the recommendation. If there was one department, he considered, in which they should be careful of increase of expenditure, it was the Gas Department. Thousands and thousands of pounds were being poured into gas-works, and everything was being done which was calculated to produce gas at a cheap rate. A new Manager had been appointed, at a large increase of salary; but in spite of all this, the fact remained that at the present moment the gas supplied was of the very poorest quality, and was charged for at the highest rate in Scotland. If their officials in the Gas Department had any special or exceptional ability, they might show it by producing gas as cheaply and of as good quality as in other places. He moved disapproval of the recommendation. Mr. Speed moved that the increase be £25. He thought that, with the present inferior quality of gas, a rise of £50 would not be acceptable to the community. Mr. Brownlee pointed out that the quality of the gas had nothing to do with the question before them, as the illuminating power was fixed by the Committee. He rather favoured the giving of £25; but if the works were well managed, the other £25 would not be much missed. On a vote, the recommendation of the Committee was adopted by 16 votes to 11. So Mr. Donald gets his increased salary. Most probably he deserves it; but that is not of interest here. It is the spectacle of a body like the Town Council of Dundee going the length, not only of discussing, but of dividing upon, the question of whether an increase should be given of £50 or of £25 a year. The giving of no increase, on the ground of economy, is understandable; but to divide the Council upon a question of £25 a year, is out of all common sense.

On Thursday, at a meeting of the Dumfries Corporation, the return which was agreed upon at the last meeting, showing the working expenses at the gas-works, and those in a number of places similarly situated, was submitted. Speaking to it, Mr. Currie referred to what he called a misleading statement made by Mr. Brunton at their last meeting, to the effect that the expenditure in the office at the gas-works had gone up by £60 during the past year. There had been an apparent increase of £49, which was explained by the Auditor requiring them to pay salaries to May 15, instead of, as they had been accustomed to do at the end of the month. As compared with the expenditure in 1900, there was last year a decrease of nearly £15. These figures showed that the gas office was not causing the extraordinary outlay some people thought it was. As to expenses in the works, they found that Dumfries was the third lowest in this respect in Scotland. It had to be noted, Mr. Currie said, that while their expenditure was going up, their income was also increasing; and they had never asked the town for a penny of taxation, which they were entitled to do. The quantity of gas made in 1901 was 89,906,000 cubic feet; and in 1902, it was 92,564,000 cubic feet—an increase of 2,658,000 cubic feet. From May 15 to Dec. 31 last, there was an increase of 1,879,600 cubic feet. In 1902, there was an increased revenue from the sale of gas of £1145. Mr. Thomson said the idea of getting the return as to working expenses occurred to him because of stories which were going about to the effect that the expenses were something enormous. The return, he might say, had been a good deal of a relief to him, as it showed that while the expenses at the Dumfries Gas-Works were not the very lowest, they were still by no means the highest. Mr. Currie had put the position clearly before the Council, showing that they had to be ashamed of nothing they had done. He would, however, press the necessity of adding more to the reserve fund than was being done at present. Something like £3000 should be laid aside, for they never knew when it might be required; and it was a pity to have the fund standing practically at zero. Mr. Lennox asked how the towns mentioned in the return had been chosen. He thought they had only been selected to mislead, because a good many towns with cheaper and better gas than Dumfries had been left out. He instanced Hawick and Galashiels as not being shown. It was replied that a number of towns which were written to did not give any answer. This question by Mr. Lennox brought out the futility of the hunt for information. Dumfries may possibly be among the lowest in the matter of working expenses; but unless a full return were obtained, it would be impossible to say so.

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KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000
ROCHESTER (Second Contract)	500,000
NEWPORT (MON.)	250,000
TOKIO, JAPAN.	1,000,000
PERNAMBUCO (Brazil)	125,000
MALTON	150,000
DULUTH, MINN. (Second Contract)	300,000
BROCKVILLE (ONT.)	250,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 Cub. Ft. SMETHWICK, 500,000 Cub. Ft. LEICESTER (2nd Cont.), 1,000,000 Cub. Ft.
GRAVESEND, 300,000 C. Ft. NEWPORT, MON. (2nd Cont.), 250,000 C. Ft. TORONTO (3rd Cont.), 750,000 C. Ft.

This was not secured upon the present occasion; and the conclusions which were drawn from the return were baseless. The subject is scarcely one for the Corporation; it is more a duty of the Manager to find out if he is paying less or more for labour than his neighbours.

The Coatbridge Gas Company have reduced the price of gas by 2d., making it 2s. 4d. per 1000 cubic feet. This is the lowest price charged for gas in Scotland; but there are two other places—Glasgow and Alloa—where the price is the same. When we look to illuminating power, we find that in Glasgow 21-candle gas is supplied, and that in Alloa it is of 23-candle power. In Coatbridge, the illuminating power is 22·75 candles. The cheapest gas is, therefore, still being sold in Alloa; but Coatbridge, with only ¼ candle less, runs it very near. When capital is taken account of, it is found that Coatbridge is at the top of the tree. There Mr. Wilson has to provide dividends of 10 and 7 per cent. upon a capital of £64,000; whereas in Alloa the capital account originally stood at £49,000, but has been reduced by the operation of the sinking fund to £30,000. Mr. Wilson's achievement is thus the more creditable of the two. If either of them were to supply gas of 16 or 14 candles, what would they be able to sell it for? Probably about 1s. 6d. per 1000 cubic feet. Meter-hires are not charged in any one of the three places; so that we may claim to have in Scotland the cheapest gas that is sold in the United Kingdom.

Early in the morning of Sunday last, fire broke out in the Gothic Iron Foundry, Falkirk, belonging to Messrs. R. & A. Main, Limited. About seven o'clock Mr. Bower, the Foundry Manager, who resides opposite the works, observed flames issuing from the roof of the electro-plating and enamelling department. Along with a friend who was staying in the house, he proceeded to the works and communicated by telephone with the police office at Falkirk, and had the Fire Brigade turned out. Before their arrival, he applied the works hose to the fire, and when the brigade came he and his friend had two sets of hose playing on the fire, which was successfully subdued by nine o'clock. The fire had apparently originated in the electro-plating department, and subsequently spread to the porcelain enamelling shop. A large quantity of valuable machinery has been destroyed, including the dynamo used for electro-plating purposes. It was fortunate that the fire was observed so early, and checked before it had spread to the adjoining buildings composing the foundry, which are closely grouped together. The damage is estimated at about £3000, which is partly covered by insurance.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 7.

Sulphate of Ammonia.

There has not been quite such keen demand, but stocks are bare, and prices have been maintained. The closing quotations are £12 11s. 3d. per ton f.o.b. Hull, £12 12s. 6d. per ton f.o.b. Liverpool, and £12 13s. 9d. per ton f.o.b. Leith. Consumers abroad have been more interested in the Spring months than in near delivery; but their views are rather below prompt values, while makers require a premium. There has been no further buying for April-September and July-December delivery, the advance required by makers having arrested operations in the meantime.

Nitrate of Soda.

Considerable shipments of nitrate of soda have been made from Hamburg to U.K. ports, and the German market has recovered somewhat from its depression. Elsewhere the market is steady, and spot prices remain 9s. 1½d. to 9s. 3d. per cwt., according to quality.

LONDON, *Feb.* 7.

Tar Products.

There is really nothing important to advise; the markets remaining in about the same position. The prices of pitch are fairly well maintained; but the demand for prompt delivery is certainly easier. Crude carbolic is very quiet. Sixty's are reported to have been sold at 1s. 6½d. to 1s. 6¾d.; but as a rule makers ask 1s. 7d. for prompt delivery, and 1s. 8d. for forward. Crystals remain steady, and a fairly good business is doing in 34-35's at 5⅝d. Some small sales of 90 per cent. benzol have been made at 10d. per gallon f.o.b. London; but only for prompt shipment. In 50-90 per cent. there is nothing doing, consumers appearing indifferent as to this article. Creosote is decidedly easier in the North; but there is a good inquiry for export from London. Some small orders for solvent have been placed for home consumption at fairly good prices, but as a rule for special qualities. There is more inquiry for toluol. Business is reported at from 7d. to 7½d. for ordinary; and makers have declined business at 8d. all over the year. Sales of pure have been made from 1s. 1d. to 1s. 1¼d. In anthracene, there is nothing fresh to advise.

The average values during the week are: Tar, 22s. 6d. to 27s. Pitch, London, 58s. 6d. to 60s.; east coast, 56s. to 57s. 6d.; west coast, 55s. to 56s. Benzol, 90 per cent., 9½d. to 9¾d.; 50-90 per cent., 8d. to 8⅛d. Toluol, 7d. to 7⅛d. Crude naphtha, 3¼d.; solvent naphtha, 8⅛d. to 9⅛d.; heavy naphtha, 9d. to 10d. Creosote, London, 1⅛d. to 1⅛d.; North, 1¼d. to 1⅝d. Heavy oils, 2d. to 2⅛d. Carbolic acid, 60 per cent., 1s. 6¼d. to 1s. 6⅜d. Naphthalene, 35s. to 55s.; salts, 25s. to 27s. 6d. Anthracene, "A" quality, 1½d. to 1¾d.; "B" quality, 1d. nominal.

Sulphate of Ammonia.

The market continues firm, and there is a strong inquiry, especially for prompt delivery. The Gaslight and Coke Company still quote £12 12s. 6d. for February-March, and now ask £12 7s. 6d. for April-September. In Hull, business has been done at £12 10s. for February-March, and there is a very good inquiry for April-June; but makers, as a rule, decline to quote over this period. In Leith, very high prices are reported; and £12 12s. 6d., and even £12 13s. 9d., are mentioned as having been paid for prompt parcels. Some of the makers ask £12 15s. for prompt; and supplies are undoubtedly very scarce. In Liverpool, there is not much change. Business is reported at £12 8s. 9d. for prompt; but only to a limited extent.

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Among the Companies and Towns supplied are The Gas Light and Coke Company, The South Metropolitan Gas Company, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Southport, Alloa, Broughty Ferry, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past Seven Years.

MORE GAS & SALEABLE COKE PER TON of COAL CARBONIZED is PRODUCED; SAVING CAPITAL, LABOUR, FUEL, WEAR & TEAR, &c.

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THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,

18, DEVONSHIRE STREET, BISHOPSGATE, LONDON, E.C.

COAL TRADE REPORTS.

Lancashire Coal Trade.

A slackening off in the demand is the general report in the coal trade of this district, and supplies of all descriptions of fuel are more plentiful on the market, with pits in many cases not working more than four to five days per week. Requirements for house-fire consumption are necessarily restricted by the openness of the season; and the better qualities of round coal are hanging at collieries, with surplus lots offering from outside districts at specially cut prices to effect clearance sales. Current quoted rates are, however, without alteration, and at the pit mouth remain about 15s. to 15s. 6d. for best Wigan Arley, 12s. 6d. and 13s. to 13s. 6d. for commoner sorts of Arley and Pemberton four-feet, and 10s. and 10s. 6d. to 11s. 6d. for common house-fire coals. The lower descriptions of round coal are not moving away quite so freely as of late; and of these there are fairly plentiful supplies on the market. The inland demand for steam, forge, and general manufacturing purposes remains moderate, with quotations about 8s. 3d. to 8s. 6d. up to 9s. and 9s. 3d. per ton at the pit for the better qualities of steam and forge coal. Of engine fuel, there is more coming upon the market from outside districts; and though local collieries are still moving away the better qualities without difficulty, common and medium sorts are plentiful, and not quite so strong in price, cheap lots being again obtainable from some outside districts. At the pit, best Lancashire slacks remain steady at 6s. 6d. to 7s. per ton, medium sorts average 5s. 3d. to 5s. 6d. and 5s. 9d.; and common slacks 4s. 3d. to 4s. 9d. In the shipping trade, there has been a decided quietening down of the demand, with prices easier where cargoes are offered for sale; and ordinary descriptions of steam coal range from about 10s. 3d. to 10s. 6d. and 10s. 9d. per ton, delivered at the ports on the Mersey.

Northern Coal Trade.

There has been rather more irregularity in the coal trade of late; but, on the whole, it is steady for a season of the year when requirements are usually weak in the North. There is still some demand for coals for the United States; but it is less pressing than it was, and the prices of steam coals are lower in consequence. Best Northumbrian steams are 10s. 9d. to 11s. per ton, f.o.b., second-class steams are 10s., and steam smalls are 5s. 6d.—the latter class being relatively scarce. In gas coals, the deliveries on the large contracts are now a little less; and the price for occasional cargoes may be put as from 9s. 6d. to 9s. 9d. per ton f.o.b. for best Durham descriptions. Some of the smaller contracts for gas coals for export have been settled; and the prices are generally from 8s. 10½d. to 9s. per ton f.o.b. In some cases, however, the rate is one for the coal delivered, and thus the value at the pits depends upon what may be allowed for the freight. Gas coke is firm at the prices last named; the production now showing some decrease.

Scotch Coal Trade.

There is no change, either in market conditions or in price, to record. The output is being well taken up, and there are encouraging inquiries for forward delivery, which makes the outlook more cheerful. The prices quoted are: Main 9s. to 9s. 3d. per ton f.o.b. Glasgow, ell 9s. 6d. to 10s. 6d., and splint 10s. 9d. to 11s. The shipments for the week amounted to 162,572 tons—a decrease upon the previous week of 50,503 tons, and of 13,347 tons upon the corresponding week of last year. For the year to date, the total shipments have been 726,912 tons—a decrease of 21,191 tons upon the same period of last year.

Stockport Water Supply.—The Stockport Corporation are proceeding with the operations for their Kinder water-works scheme, which is to cost nearly a million of money. A contract for one of the dams, filters, and tank has just been let to Mr. Abram Kellet, of Ealing, to the amount of £248,724 15s. 3d.; and Mr. James H. Madeley, of Birmingham, has been appointed Resident Engineer.

The Water Supply to the Royal Eye Hospital.—According to correspondence which has taken place between the Secretary of the Lambeth Water Company (Mr. H. Wilkins) and Professor Malcolm M'Hardy, on the subject of the complaint recently made by the latter at the Southwark Police Court in regard to the supply of water to the Royal Eye Hospital, St. George's Circus, as noticed in the "JOURNAL" last week (p. 274), intimation of the failure of the supply on the 17th ult was sent to the local turncock, who neither attended to it nor reported it to his foreman; and he has been severely reprimanded for his neglect of duty. Mr. Wilkins adds that all complaints received at the office receive individual attention; and if the authorities of the hospital had sent there when they failed to obtain satisfaction in the first instance, the matter would have been then investigated and put right by the responsible officers of the Company.

Gas Capital Expenditure and other Matters at Halifax.—The Halifax Town Council last Wednesday authorized the Town Clerk to make application to the Local Government Board for their sanction to the borrowing of £53,254, for gas-works purposes. The largest item to be applied for was "capital expended beyond borrowing powers Dec. 31, 1902, £17,558." Other items were: Stores, £4000; mains, £8000; meters, £4000; coal stores and siding, £5000; completing boilers, steam-pipes, feed-water heaters, &c., £1000; tar-works, £2417; locomotive, £1000; and contingencies, £1650. The Gas Committee have instructed the Engineer (Mr. T. Holgate) to present returns as follows: "(*a*) The cost of repairs to the large washer and scrubber. (*b*) The cost of repairing the inclined retorts prior to commencing them last time, with the number of days (24 hours) they had worked. (*c*) A statement of plant now in the works, in each department, and, where possible, the date when the machine or engine was bought." Mr. Holgate has reported that the cost of repairs necessitated to the carburetted water-gas plant by the explosion which took place at the works some time ago was £234.

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East Ardsley Gas Company's Bill.—On a report by the Gas and Electricity Committee, the Morley Corporation have decided to oppose the Bill of the East Ardsley Gas Company.

Public Lighting of Grantham.—At last Wednesday's meeting of the Grantham Town Council, the Lighting Committee reported that they had had under consideration the question whether it would be in the interest of the Council to put an end to the contract with the Grantham Gas Company for lighting the streets. After giving the matter mature consideration, the Committee decided to recommend the Council to terminate the contract at the close of the current year. If this recommendation was adopted by the Council, the Committee would ask for power to advertise for tenders for lighting the streets of the borough. Alderman Wand said the Isle of Wight was lighted much better than Grantham, and at a much cheaper rate. Alderman Gamble moved an amendment to the effect that the contract with the Gas Company should continue. On being put to the vote, five voted for the amendment and ten against. The report of the Committee was carried eventually by ten votes to two.

Loughborough's Capacity to Help Leicester.—In presenting to the Leicester Town Council the figures as to the position of the water supply (as reported in our issue of Jan. 13), Alderman Wood made a remark to the effect that they could not expect any help from Loughborough, on account of the delay that was taking place in the construction of the Blackbrook reservoir. This is not the first time that the Alderman has made a similar declaration; and Mr. J. Cartwright, the Chairman of the Loughborough Corporation Water Committee, took an opportunity, at the meeting of the Council yesterday week, of refuting it. He said that, when the statement was first made by Alderman Wood, he (Mr. Cartwright) called the attention of their Engineers to it; and they confirmed him in the assertion that if Leicester choose to avail themselves of it, they could have practically the whole of the flow of Blackbrook during the winter months. As their new main from Swithland into Derbyshire, which they had to construct and pay for under any circumstances, crossed the Forest Road within half-a-mile of their works, the expense of connecting the two would be a mere trifle. With their present pipe from Blackbrook to Nanpantan, they could deliver, in rough figures, a million gallons per day into the Swithland reservoir during the whole of the winter months; and if another pipe was laid down from Blackbrook to Nanpantan, for which Loughborough possessed the powers, this could be more than doubled. It seemed absurd to say that Loughborough could not help Leicester in their present difficulty when they had millions of gallons of water running to waste for seven months out of the twelve; and the Leicester reservoirs were at the same time half empty. If Leicester really wanted water, they could always start the dry months of the year with full reservoirs by purchasing it from Loughborough during the winter; but he could not say how long this state of affairs would continue. Had they availed themselves of what Loughborough could offer them some time ago, he did not think they would now have had to face their present difficulty.

Malvern Water Supply.—The recent find of water at the Malvern Link boring station has been subjected to further tests, and has been found to yield 215,000 gallons per day, without lowering the water in the well. This will be ample for the town's requirements; and the Council now regard the water difficulty, which has been very serious, as at an end. The water has been certified as thoroughly pure. The cost of mains, &c., to connect the well with the existing reservoirs will be about £10,000; and application is to be made to the Local Government Board to sanction a loan.

Electricity v. Gas at Stretford.—The minutes of the General Purposes Committee submitted to the meeting of the Stretford Urban District Council last Tuesday, stated that the Committee had resolved to decline the offer of the Gas Company to improve the lighting of the district by adopting incandescent burners, and to obtain particulars as to lighting by arc lamps. The minutes having been submitted, Mr. Estcourt moved that the proposal as to street lighting be referred back. He contended that incandescent gas was the best system, and that arc lights would cost four times as much. The amendment, however, was neither supported nor discussed; and the Committee's proceedings were adopted.

Expenditure on Rural Water Supplies.—A correspondent of "The Times" has called attention to the growth of rural as compared with urban expenditure. He supports his statements by referring to an inquiry recently held at Ingatestone by a Local Government Board Inspector into the application of the Chelmsford Rural District Council for sanction to borrow no less than £10,500 for a water supply for Ingatestone and Fryerning. During the inquiry, Dr. Thresh, the Medical Officer of Health for the County of Essex, pointed out that there was, unfortunately, a prevalent impression that the Local Government Board encouraged extravagant schemes of water supply for a local authority, and insisted upon a great deal more than was really necessary, or certainly much more than would be done by a private company. This impression he met with everywhere, and it was paralyzing all his efforts in Essex to get improvements effected. The present scheme was to cost £10,500, or £30 per house. Besides this, there would be an annual outlay for pumping of £150, which, capitalized, meant an additional £3000. The total cost, therefore, was £13,500, or £40 per house supplied. This appeared an enormous sum to be paid even for a water supply; and the publication of these figures would confirm the impression that sanitary improvements could now only be carried out at a ruinous cost. He made these remarks in the hope that the Local Government Board might be persuaded to consider all such schemes carefully, with the view of ascertaining whether the most economical plans were being adopted, and to use their influence to prevent unnecessary expenditure. He thought the expense here was about £2000 more than it would be if a private company had taken it up. These statements, the correspondent claims, completely substantiate the principles put forward by the writer of the articles on "Municipal Socialism" which lately appeared in "The Times."

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Gas Workers in the Provinces.—The remaining county volumes of the census of 1901 are now coming out in rapid succession, the latest to appear being Bedford, Denbigh, Carnarvon, Carmarthen, Hereford, and Cardigan. The numbers of gas workers enumerated therein are 162, 78, 60, 58, 62, and 11 respectively.

Proposed Reduction to Large Gas Consumers at Stockport.—The Stockport Town Council, in view of the promotion of the North-Western Electricity and Power Gas Bill, are considering the advisability of making some concession to consumers of gas for power purposes, so as to enable them to meet any competition that may arise. The proposal is that persons who use gas in a proportionate amount all the year round shall enjoy a larger reduction in price than those who are irregular in their requirements.

Water Scheme for Daventry.—The Local Government Board have sanctioned the water scheme for Daventry, and a loan of £7306 to carry out the work. Daventry is a town of 4000 inhabitants, and the present water supply is obtained from wells and a small company known as the Boro Hill Water Company. Boring was commenced at Dodford, 3 miles distant, and a good supply was obtained; but the water was rather hard. The water will be pumped to a reservoir on Boro Hill, where land has been acquired for the purpose. The Council's advisers in the matter are the Town Surveyor (Mr. J. B. Williams) and Mr. F. Eunson, Assoc.M.Inst.C.E., of Northampton.

National Gas-Engine Company, Limited.—The report of the Directors of this Company for the year ended the 31st of December last, shows that the net profit for the year, after deducting ample depreciation on buildings, tools, &c., and allowing for trade expenses and management salaries, is £26,497. After paying the interim dividends on both preference and ordinary shares in July, and adding the sum brought forward from last year, there is a total of £22,381 to be dealt with. The Directors propose to pay the dividend on the preference shares, and one at the rate of 12 per cent. per annum on the ordinary shares for the six months (making 10 per cent. for the year); leaving £14,178, out of which it is proposed to place £5000 to the special reserve fund, making it £25,000, and to carry forward £9178.

Teignmouth Water Supply.—Strong condemnation of the present water supply of Teignmouth is published in a report by Dr. Piggott, Medical Officer of Health of the town. The Coombe Brook water, which constitutes one-half the supply, is, he says, steadily deteriorating in quality; and he submits an analysis by the Clinical Research Association which describes a filtered sample as "very little better than the unfiltered sample," as "worse than the filtered sample last analyzed," and, finally, as "unfit for drinking." Dr. Piggott, in explaining why he publishes this analysis, says that though the District Council have formally recognized the unsatisfactory nature of this water, there still exist a number of active but misguided believers in the suitability of the stream as a source of supply for domestic purposes. The measures which the Council have taken to obtain an improved supply do not appear to Dr. Piggott to be likely to answer the purpose. He disagrees entirely with Mr. T. Matthews, the gentleman who recommended the Council to pump the existing borehole at Mylor, and to sink another at Holcombe. He thinks this would be a most hazardous speculation, most likely to result in heavy financial loss, and possibly in grave damage to the present limited water supply from Mylor. As to the pumping of the borehole there, it has been proved that this gives a temporary increase of supply; but he considers it extremely unlikely that the increase will be permanent.

Messrs. F. C. Sugden and Co., of Leeds, have had repeat orders placed with them for semi-deep regenerators and ironwork by the Omagh Gas Company, and for shallow regenerators and ironwork by the Leatherhead Gas Company. In the latter instance it is the third repeat order.

The Directors of the Highbridge Gas Company have expressed their pleasure at the successful results of the working of the undertaking by deciding to allow the Manager (Mr. A. E. Tulk) in future a bonus of 2½ per cent. of the profits in addition to his salary, and to give large consumers the benefit of a 10 per cent. reduction in price.

The great electric generating plant at Niagara Falls was destroyed by fire on the night of the 30th ult. The correspondent of the "Standard" says the fire was caused by lightning, which struck a cable having defective insulation. The short-circuit thus caused resulted in the explosion of one of the big transformers in the power-house operated by the Falls.

The Southwark Borough Council have decided to ask the Directors of the Gaslight and Coke Company to insert in their Bill a proviso to the effect that nothing in the clause regulating the standard price of gas shall be deemed to in any way affect the provision contained in the Order in Council of May 22, 1883, which specified that the charges should never exceed those of the South Metropolitan Gas Company.

The water supply for the Coolgardie and Kalgoorlie goldfields was formally inaugurated on the 24th ult. by Sir John Forrest. The difficulties of the undertaking were immensely increased owing to the districts served being 1300 feet above the source of supply, thereby necessitating the erection of twenty sets of pumps distributed at eight pumping-stations along the route. The works can now daily distribute 6 million gallons in Kalgoorlie, 350 miles from the source of supply.

Messrs. Graham, Morton, and Co., of Leeds, have issued a beautifully illustrated catalogue of their conveying, screening, and crushing plants. Every page contains one or more reproductions of photographic views; and they show the multifarious uses to which conveying and such-like machinery is now put, and, it follows, the diversity of large and important plants with which the firm have successfully dealt. In the fore part of the book, the old, slow, laborious, and costly methods of handling material by the "human conveyor" are illustrated; and these are succeeded by numerous photographs of the new way. To the engineer every page of the 150 in the book has its features of interest; and a word of congratulation must be passed to Messrs. Graham, Morton, and Co. on the instructive collection of work they have made for illustration.

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WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

SITUATIONS VACANT.
- CARBONIZING FOREMAN. No. 3989.
- CARBONIZING FOREMAN. No. 3996.
- CLERK OF WORKS. Plymouth Water Department. Feb. 21.
- GAS-FITTER. Andover Gas Company.
- GENERAL CLERK. No. 3985.
- GENERAL FOREMAN. Londonderry Gas-Works.
- GENERAL MANAGER (South America). No. 3992.
- JUNIOR CLERK (in London Office). No. 3997.
- MECHANIC AND SMITH. No. 3983.
- METER INSPECTOR. Long Eaton Gas-Works.
- METER INSPECTOR. Musselburgh Gas Company.
- TRAVELLER (Lamps and Fittings). No. 3998.
- WATER MANAGER. Airdrie and Coatbridge Water Trustees. Feb. 14.
- WORKING MANAGER AND FITTER. Knighton Gas Company.
- WORKING MANAGER. No. 3991.

SITUATIONS WANTED.
- MANAGER OR ASSISTANT-MANAGER. No. 3994.
- SUPERINTENDENT OF TAR OR CREOSOTING WORKS. No. 3988.
- WORKING FOREMAN. No. 3990.

PUPIL IN GAS-WORKS.—GOODSON. Heckmondwike.

BUSINESS FOR DISPOSAL.—Greenall's Meter Syndicate, Leeds.

PLANT, &c. (Second-Hand), FOR SALE.
- CONDENSER. Redditch Gas-Works.
- EXHAUSTER AND ENGINE (combined). No. 3987
- GOVERNOR (6-inch). Pontifex and Co., London.
- METER (500-Light). Heaton, Skipton.
- PURIFIERS. Lancaster Gas Department. Feb. 16.

PLANT, &c., WANTED.
- EXHAUSTER AND ENGINE (Combined). No. 3995.
- METERS (DISUSED), BRASS, COPPER, &c. Smith, Bradford.
- PURIFIERS, VALVES, &c. No. 3995.

MEETINGS OF COMPANIES.
- BARNET GAS AND WATER COMPANY. Feb. 27.
- BRENTFORD GAS COMPANY. Feb. 20.
- MITCHAM AND WIMBLEDON GAS COMPANY. Feb. 24.
- NORTH MIDDLESEX GAS COMPANY. Feb. 25.
- RIDDINGS GAS COMPANY. Feb. 27.
- TOTTENHAM AND EDMONTON GAS COMPANY. Feb. 21.

SALES OF STOCKS AND SHARES.
- GAS METER COMPANY. Feb. 17.
- GOSPORT WATER COMPANY. Feb. 17.
- HARROW AND STANMORE GAS COMPANY. Feb. 17.
- ILFORD GAS COMPANY. Feb. 17.
- LOWESTOFT WATER AND GAS COMPANY. Feb. 24.

SALES OF STOCKS AND SHARES (*Continued*)—
- SOUTH ESSEX WATER COMPANY. Feb. 17.
- SOUTH WEST SUBURBAN WATER COMPANY. Feb. 24.
- SUNDERLAND AND SOUTH SHIELDS WATER COMPANY. Feb. 19.
- TOTTENHAM AND EDMONTON GAS COMPANY. Feb. 28.
- WEST HAM GAS COMPANY. Feb. 18.

SHARES WANTED IN C. & W. WALKER, Ltd. No. 3993.

TENDERS FOR

AMMONIACAL LIQUOR.
- BRISTOL GAS COMPANY. Tenders by Feb. 24.

BRASS COCKS.—BARROW-IN-FURNESS. Tenders by Feb. 17.

COOKERS.—BARROW-IN-FURNESS. Tenders by Feb. 17.

FIRE CLAY GOODS.
- BARROW-IN-FURNESS GAS DEPARTMENT. Tenders by Feb. 17.
- CHORLEY GAS DEPARTMENT. Tenders by Feb. 17.
- LEIGH GAS DEPARTMENT. Tenders by Feb. 19.
- ROTHERHAM GAS DEPARTMENT. Tenders by Feb. 17.

GASHOLDERS.
- BURNHAM GAS COMPANY. Tenders by Feb. 17.
- COVENTRY GAS DEPARTMENT (Two). Tenders by Feb. 14.

GAS-WORKS.—SILSDEN DISTRICT COUNCIL. Tenders by Feb. 23.

LAMP COLUMNS.—SWINDON CORPORATION. Tenders by Feb. 17.

METERS.
- BARROW-IN-FURNESS GAS DEPARTMENT. Tenders by Feb. 17.
- SWINDON CORPORATION. Tenders by Feb. 17.

PIPES AND CONNECTIONS, &c.
- BARROW-IN-FURNESS GAS DEPARTMENT. Tenders by Feb. 17.
- EDINBURGH AND LEITH GAS COMMISSIONERS. Tenders by Feb. 23
- STOCKTON-ON-TEES GAS DEPARTMENT. Tenders by Feb. 24.

PURIFIERS.—LANCASTER GAS-WORKS. Tenders by Feb. 16.

RESERVOIR (Covered), &c.—PLYMOUTH. Tenders by Feb. 23.

RETORTS.
- BARROW-IN-FURNESS GAS DEPARTMENT. Tenders by Feb. 17.
- CHORLEY GAS DEPARTMENT. Tenders by Feb. 17.
- LEIGH GAS DEPARTMENT. Tenders by Feb. 19.

RETORT FITTINGS.—LEICESTER GAS-WORKS. Tenders by Feb. 21.

SULPHURIC ACID.—BARROW-IN-FURNESS. Tenders by Feb. 17.

TAR.
- BARROW-IN-FURNESS GAS DEPARTMENT. Tenders by Feb. 17.
- DARWEN GAS DEPARTMENT. Tenders by Feb. 21.

WELL CYLINDERS.—CLACTON. Tenders by Feb. 23.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.

Payable in Advance. If credit is taken, the charge is 25s. a year.

All Communications, Remittances, &c., to be addressed to

WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.

JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON HOUSE,
OLD BROAD STREET,
LONDON, E.C.

ANDREW STEPHENSON, AGENT. All communications RE OXIDE to the COMPANY as above.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.

Resists 4500° Fahr. Best for GAS-WORKS.

ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

BROTHERTON & CO., LIMITED.

Offices: Commercial Buildings, LEEDS. Correspondence invited.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.

Telegrams: "ENAMEL." National Telephone 1759.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

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"Braddock, Oldham." "Metrique, London."

DUTCH OXIDE OF IRON.

EERSTE Hollandsche Yzererts Maaty (First Dutch Bog Ore Company, Ltd.), ROTTERDAM.

General Manager for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.

London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.

General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

AMMONIACAL LIQUOR wanted.

BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PATENTS AND TRADE MARKS

PUBLICATIONS. "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.

MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

COAL GAS TAR wanted.

Gas Managers in Gloucester, Somerset, Worcester, Devon, Wilts, Hereford, Monmouth, and Glamorgan PLEASE NOTE. BEST PRICE offered either on Fixed or Sliding-Scale Basis.

State Quantity to offer for Prompt and Forward Delivery.

The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

OXIDE OF IRON.

FIRE CEMENT, PAINT, GAS COAL.

BALE & CHURCH, 5, CROOKED LANE, LONDON, E.C.

GAS TAR wanted.

BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

IT is worth your while to buy direct. THE RELIANCE LUBRICATING OIL COMPANY 19 and 20, Water Lane, Great Tower Street, London, E.C., handle all kinds of Lubricating Oils, for Engines, Cylinders, Dynamos, Spindles, &c., Burning Oils, Solar Distillates, Carburetting Oils, and Spirits for Gas Making; Motor Oils, Fuel Oils, Animal, Fish, and Vegetable Oils, &c., for all purposes. Write for our "Trade Mark" Inkstand, sent free to customers. Non-customers, 2s. 6d. each. RELIANCE LUBRICATING OIL COMPANY, London, Glasgow, Newcastle-on-Tyne, &c. Established 1858. Telegraphic Address: "Subastral," London; A.B.C. Code used. Telephone No.: Avenue 5891.

SULPHURIC ACID for Sale.

BROTHERTON AND CO., LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.

Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.

READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

PENNY-IN-THE-SLOT WORK.

H. GREENE & SONS, Ltd., are prepared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.

SURREY ENGINEERING WORKS, BLACKFRIARS ROAD, LONDON, S.E.

Telephone: 1693 HOP. Telegrams: "LUMINOSITY."

SULPHATE OF AMMONIA SATURATORS and LEAD WORK for Sulphate of Ammonia Plants.

For REPAIRS or ALTERATIONS, ring up "0848 BOLTON," or Telegraph "SATURATORS, BOLTON."

Largest Practice and most Up-to-Date Works in Britain.

JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.

BY the adoption of Cripps's Bye-Pass VALVES inside your Purifiers, you can relieve the Back-Pressure in the Lower Tiers when the Purifying Material gets hard. They are extremely useful and economical.

Sole Makers: C. & W. WALKER, LIMITED, Midland Iron-Works, Donnington, near Newport, SHROPSHIRE.

STREET AND SHOP LAMPS AND LANTERNS.

MARK DUFFIELD & SONS (Established 200 Years), makers of Street and Shop Lamps to own Pattern and Design. Any description of Lamp made. Inquiries invited.

London Manager: EDWARD PADFIELD, West India House, 96 & 98, LEADENHALL STREET, E.C.

Telegraphic Address: "EUPATHY, LONDON."

HECKMONDWIKE GAS COMPANY.

MR. A. F. GOODSON, Engineer and Secretary to the above COMPANY, has a vacancy for a PUPIL. A Premium will be required.

Full details furnished on application.

These are modern Works, and fitted with up-to-date Machinery.

Please apply as above.

ADVERTISER (33) desires Position as SUPERINTENDENT in Tar-Works or Creosoting Yard—England or Abroad. Thorough practical experience in both Branches. Good Fitter and Engineer. Excellent Testimonials and References.

Address No. 3988, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ENGAGEMENT wanted as Working FOREMAN. Thorough knowledge of all Branches, light Smithing and Relacquering and Bronzing. Accustomed to Estimating and Superintending. Seaside preferred; Abroad not objected to. Age 35.

Address No. 3990, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, AN APPOINTMENT,

AS MANAGER of a medium-sized Works, or ASSISTANT-MANAGER in a large Gas-Works, by a fully qualified Gas Engineer and Manager, who has had large experience in the Management of Works, and in the Designing, Setting Out, and Construction of up-to-date Gas Plant. Moderate Salary. Excellent References and Testimonials.

Address No. 3994, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MECHANIC and Smith wanted, at once. Permanent Situation to good man (Birmingham District).

Apply, by letter, stating all Particulars, to No. 3983, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SECRETARY requires Junior Clerk for City (London) Office. Must have had some previous experience.

State, by letter, Salary required and full Particulars, to No. 3997, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENERAL Manager wanted for South American Gas-Works.

Applications, stating Age, whether Married, Salary expected, Qualifications, and previous Experience, and enclosing *copies* only of recent Testimonials, to No 3992, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Knighton Gas Company are open to receive APPLICATIONS for the post of WORKING MANAGER and FITTER. Wages 27s. 6d. a week, with Cottage, Garden, Coal, and Gas.

For further Particulars, apply to the SECRETARY, Gas Company, Knighton, RADNORSHIRE.

WATER-WORKS MANAGER.

THE Airdrie, Coatbridge, and District WATER TRUSTEES who, as at 31st May next, take over the Undertaking of the Airdrie and Coatbridge Water Company, require a thoroughly qualified MANAGER. A practical knowledge of the Construction and Maintenance of Water-Works essential.

Salary £300 per annum.

Applications, with twelve *copies* of Testimonials, and marked "Water-Works Manager," to be lodged with JOHN J. M'MURDO, Solicitor, AIRDRIE, on or before the 14th of February.

MUSSELBURGH GAS COMPANY.

WANTED, a Young Man as Meter INSPECTOR and to assist in Office.

Apply to the MANAGER, Gas Company, MUSSELBURGH.

WANTED, a reliable Meter Inspector, to help with collecting Slots. References required.

G. STEVENSON, Gas-Works, LONG EATON.

WANTED, an experienced Gas-Fitter. Must be a willing worker and obliging. Good on Compo. and Iron Fitting.

Give full Particulars, with Age and Testimonials, to S. TEMBLETT, Manager, Gas-Works, ANDOVER.

WANTED, at once, by a Suburban Gas Company, a GENERAL CLERK (about 25 years of age), used to the work of a Gas Company's Office.

Apply, by letter, stating Age, Experience, and Salary required, to No. 3985, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an experienced Traveller, with a connection in the North of England, by a London Firm, for Petroleum Lamps and Gas-Fittings. Applicants should state previous Employment and Salary expected.

Address No. 3998, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WORKING Manager wanted for a Gas- Works, 30 miles from London, making about 4 million feet per annum. Must be capable of undertaking all duties on the Works and Outside Fitting and Mainlaying; trustworthy; and furnish satisfactory References as to Character and Ability.

Apply, by letter, to No. 3991, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Carbonizing Foreman to take charge of a section of Retort-Houses in large Gas-Works in Midlands. None but experienced Carbonizers capable of obtaining first-class results need apply.

Applications, by letter, stating Age, Experience, and Wages required, accompanied by *copies* of Three recent Testimonials, to No. 3989, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CARBONIZING FOREMAN.

WANTED, in a Works near London, a good CARBONIZING FOREMAN. He must understand his work, and be able to control men under him. Eight-hour work. Wages to commence £2 2s. per week. Two references, one to present employer, necessary.

Apply, by letter, to No. 3996, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COUNTY BOROUGH OF PLYMOUTH.

WANTED, Temporary Clerk of Works during the Construction of a Covered Reservoir at the Blackadon Asylum, Wrangaton, South Devon.

The Engagement will be for six months; and it is essential that applicants should have had considerable experience in Water-Works Construction, especially Concrete Work, and be thoroughly efficient in levelling and setting out Works.

Applications, endorsed "Clerk of Works," stating Salary required, with Age and full Particulars of Experience, accompanied by *copies* of not more than Three recent Testimonials, to be sent to the undersigned not later than Saturday, the 21st inst.

FRANK HOWARTH, Assoc.M.Inst.C.E.,
Water Engineer.

Municipal Offices, Plymouth,
Feb. 5, 1903.

LONDONDERRY GASLIGHT COMPANY.

GENERAL FOREMAN.

WANTED, by the above Company, a GENERAL FOREMAN, who must be used to work in connection with Inclined Retorts, Elevating and Conveying Machinery, Carburetted Water Gas, the Manufacture of Sulphate of Ammonia, &c.

He must be a thoroughly practical man, sober, and thoroughly capable of taking entire charge of the Works in the absence of the Manager.

To live on the Works—House, Gas, and Coal provided.

Apply, with recent Testimonials, stating Age, Wages expected, and full Particulars, to

R. J. SKINNER,
Manager.

Gas-Works, Lecky Road,
Londonderry, Jan. 24, 1903.

WANTED, old Disused Gas-Meters, BRASS, COPPER, and LEAD ASHES for Cash.

J. SMITH, Broker, Canal Road, BRADFORD.

SHARES Wanted in C. & W. Walker, Limited.

State whether Preference or Ordinary, and Price required, to No. 3993, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Second-hand Exhauster and ENGINE (combined), 3000 feet per hour. PURIFIERS, 6 feet, 10 feet, and 12 feet square, complete. VALVES, Four-Way. Various sizes.

Address No. 3995, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.

J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE.—A Five Hundred (500) Light Dry GAS-METER, made by Thomas Glover and Co., in 1880. Very little used.

Apply to ROBT. HEATON, Bank Buildings, SKIPTON.

TO BE SOLD—Purifiers, Two or Four, 10 feet square by 4 ft. 6 in. deep, planed Joints, Connections, and Overhead Girders.

Write J. WRIGHT, 181, QUEEN VICTORIA STREET, E.C.

A BARGAIN—Water-Cooled Condenser in perfect condition. Capacity 25,000 cubic feet per 24 Hours.

Address A. E. LAYTON, Gas-Works, REDDITCH.

EXHAUSTER, with Engine combined, 8000 to 15,000 cubic feet per hour, all Connections, by Tangye. In capital order. £90.

Address No. 3987, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SECOND-HAND 6-inch Governor for SALE. Practically new, and in very good condition.

Price to, and Particulars from, S. PONTIFEX AND CO., 17, Coleman Street, LONDON, E.C.

FOR SALE—Very good Gas Plant as under:—

PURIFIERS—Four, 12 feet square, with 8-inch Centre-Valve and Connections. Planed Joints.
Kirkham WASHER-SCRUBBER, 300,000 cubic feet per diem., with Engine and 8-inch Valves and Connections.
Livesey WASHER, 250,000 cubic feet per diem, with 8-inch Valves and Connections.

Photos. sent on application to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

TO CAPITALISTS.

THE Greenall Positive Meter Syndicate having now fully developed their PATENT "POSITIVE METER"—which has been received with a large amount of success on its introduction, orders and repeat orders having been supplied to no less than 165 Gas Companies and Corporations within a period of Sixteen Months—they now consider the time has arrived for commencing manufacturing their Meters on a much larger scale, and would therefore be disposed to NEGOTIATE FOR THE SALE of their BUSINESS and PATENTS, either by Private Treaty or by Tender.

The highest or any offer not necessarily accepted.

All Offers to be addressed to the CHAIRMAN OF THE COMPANY at the Registered Offices, No. 7, Greek Street, LEEDS.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the supply of machine-moulded FIRE-CLAY RETORTS, FIRE-BRICKS, CAST-IRON PIPES, WROUGHT-IRON TUBES and FITTINGS, BRASS COCKS, GAS-METERS, GAS-COOKERS, and SULPHURIC ACID as may be required from the 1st day of April next to the 31st day of March, 1904.

Sealed Tenders, on Forms to be obtained at the office of the Manager of the Gas and Water Works, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Stores," to be delivered at the Town Clerk's Office on or before Tuesday, the 17th of February, 1903.

The lowest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.

Town Hall, Barrow-in-Furness,
Jan. 30, 1903.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works from the 1st day of April next to the 31st day of March, 1904, delivered into the Purchasers' Tank-Waggons at the Gas-Works Siding.

Any further Information may be had on application to the Manager of the Gas-Works.

Sealed Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Tar," to be delivered at the Town Clerk's Office, on or before Tuesday, the 17th of February, 1903.

The highest or any Tender not necessarily accepted.

By order,
C. F. PRESTON,
Town Clerk.

Town Hall, Barrow-in-Furness,
Jan. 30, 1903.

CORPORATION OF LEICESTER.

RETORT FITTINGS, HYDRAULIC MAINS, MOUTHPIECES, &c.

SECTION No. 1.—CONTRACT No. 73.

THE Gas and Electric Lighting Committee of the above Corporation are prepared to receive TENDERS for the supply of RETORT FITTINGS, HYDRAULIC MAINS, SELF-SEALING MOUTHPIECES, &c., at their Aylestone Road Works.

Drawings may be seen, and Specification and Form of Tender obtained, upon application to the Engineer, and on payment of the sum of £5, which amount will be returned upon receipt of a *bonâ-fide* Tender.

Tenders, addressed to Mr. Councillor Edwards, Chairman, and endorsed "Tender for Retort-Fittings, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, the 21st day of February, 1903.

The Committee do not bind themselves to accept the lowest or any Tender.

ALFRED COLSON, M.Inst.C.E., M.Inst.E.E.,
Engineer and Manager.

Offices: Millstone Lane,
Leicester, Feb. 7, 1903.

CLACTON URBAN DISTRICT COUNCIL.

WELL CYLINDERS.

CONTRACT No. 4.

THE above Council are prepared to receive TENDERS for the supply of about 20 Tons of Cast-Iron WELL CYLINDERS.

Copies of the Specification, Form of Tender, and Drawings may be obtained from the Engineer, Mr. Sydney Francis, Assoc.M.Inst.M.E., Town Hall, Clacton-on-Sea.

Sealed Tenders, endorsed "Tender for Well Cylinders," to be delivered to the undersigned not later than Twelve o'clock noon on Monday, Feb. 23, 1903.

The Council do not bind themselves to accept the lowest or any Tender.

GEO. T. LEWIS,
Clerk to the Council.

Town Hall Buildings, Clacton-on-Sea,
Feb. 7, 1903.

SILSDEN URBAN DISTRICT COUNCIL.

NEW GAS-WORKS.

THE above Council are prepared to receive TENDERS for the construction of a COMPLETE GAS-WORKS, to be erected at Silsden by the 30th of March, 1904. The Works have been designed for an Annual make of 12 Million cubic feet.

The Drawings and Specifications may be seen at the Town Hall, Silsden, and copies of the Specifications only may be obtained upon application to the undersigned, upon payment of One Guinea each, which will not be returned.

Tenders to be addressed to the Chairman of the Council on or before the 23rd day of February, 1903, endorsed "Gas-Works."

The Council do not bind themselves to accept the lowest or any Tender.

By order,
JOHN DRIVER,
Clerk.

Town Hall, Silsden,
near Keighley.

THE BRISTOL GAS COMPANY.

AMMONIACAL LIQUOR.

THE Directors invite Tenders for the purchase of the LIQUOR to be produced at their three Stations during a period of One, Three, Five, or Seven Years commencing on the 1st day of July, 1903.

The annual quantities and strengths of the Liquor produced at each of the Stations are approximately as under:—

Avon Street ..	1,600,000 galls.,	13½-ounce	strength.
Canons' Marsh	1,500,000 ,,	13 ,,	,,
Stapleton ..	1,900,000 ,,	15 ,,	,,

Particulars, with Forms of Tender, may be obtained on application to the undersigned, to whom also Tenders, sealed and endorsed "Tender for Ammoniacal Liquor," must be delivered not later than Tuesday, the 24th day of February, 1903.

The Directors do not bind themselves to accept the highest or any Tender.

JOHN PHILLIPS,
Secretary.

Chief Offices: Canons' Marsh,
Bristol, Jan. 31, 1903.

TO GASHOLDER MAKERS.

THE Coventry Corporation Gas Committee invite TENDERS for the manufacture and erection of TWO FOUR-LIFT GASHOLDERS, with Guide-Framing, at their Foleshill Works.

Each Gasholder will be to the following dimensions: Inner Lift, 141 ft. 6 in. diameter; Second Lift, 144 ft. diameter; Third Lift 146 ft. 6 in. diameter; and Outer Lift, 149 ft. diameter—Three Lifts being 29 ft. deep, and one Lift 29 ft. 6 in. deep.

Specification, with Form of Tender and Schedule of Quantities, may be obtained on application to the undersigned, and prints of the Drawings will be supplied, if desired, upon payment of £1 1s., which will *not* be returned.

The Committee do not bind themselves to accept the lowest or any Tender.

Sealed Tender, addressed to the Chairman of the Gas Committee, Gas-Works, Coventry, and endorsed "Tender for Gasholders," must be delivered on or before Saturday, Feb. 14 next.

FLETCHER W. STEVENSON,
Engineer and General Manager.

Gas-Works, Coventry,
Jan. 23, 1903.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

15-INCH CAST-IRON MAINS.

THE Gas Commissioners are prepared to receive TENDERS for the supply and delivery of about 370 Tons of 15-inch diameter CAST-IRON SPIGOT and FAUCET MAIN PIPES in 12 feet lengths, along with CONNECTIONS and SPECIALS.

Contractors may also quote for Pipes to their own pattern, but not exceeding the specified weight.

Deliveries to be in regular weekly quantities as required commencing at the end of March and continuing up to the 30th day of June next.

The Pipes to be delivered on the North British or Caledonian Railway Systems, or free on Rail at Leith or Granton Harbours.

Specifications, Schedules, and Forms of Tender may be obtained upon application to Mr. W. R. Herring, Chief Engineer and Manager, New Street Works, Edinburgh.

Tenders to be lodged with the undersigned on or before Monday, the 23rd day of February, 1903, not later than Ten a.m., endorsed "Tender for Main Pipes."

The Commissioners do not bind themselves to accept the lowest or any Offer, and reserve to themselves the right of accepting the whole or any portion of the Material tendered for.

JAMES M'G. JACK,
Clerk.

25, Waterloo Place, Edinburgh,
Feb. 3, 1903.

COUNTY BOROUGH OF ROTHERHAM.

(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the supply and delivery of FIRE-CLAY GOODS for the ensuing season.

Forms of Tender may be had on application to the Engineer, Mr. Frank A. Winstanley, and must be returned to the undersigned on or before Tuesday, the 17th inst.

H. HAMPTON COPNALL,
Town Clerk.

TENDERS FOR PURIFIERS.

THE Lancaster Corporation Gas Committee hereby invite TENDERS for the supply of PURIFIERS (Green's type); also for the PURCHASE and REMOVAL of Four OLD PURIFIERS and the ALTERATION and FIXING of a WROUGHT-IRON GIRDER.

Plans and Specifications may be seen at the Gas-Works, St. George's Quay.

Sealed Tenders, endorsed "Purifiers," to be delivered to the Town Clerk on or before Twelve Noon, Monday, the 16th inst.

C. ARMITAGE,
Engineer.

BOROUGH OF CHORLEY.

(GAS DEPARTMENT.)

FIRE-CLAY GOODS.

TENDERS are invited for the supply and delivery of RETORTS and FIRE-BRICKS.

Form of Tender and further information as to quantities may be obtained from Mr. J. W. Allin, Gas Engineer.

Tenders, endorsed "Tender for Retorts, &c.," to be delivered not later than Tuesday, the 17th day of February, 1903, addressed to the undersigned.

The Committee do not bind themselves to accept any Tender.

By order,
JNO. MILLS,
Town Clerk.

BOROUGH OF LEIGH.

(GAS AND WATER DEPARTMENT.)

THE Gas Committee of the above Corporation invite TENDERS for the supply of FIRE-CLAY, RETORTS, and BRICKS.

Forms of Tender and further Particulars may be obtained on application to the Manager, Mr. J. Gibson, Gas-Works, Leigh.

Sealed Tenders, endorsed "Tender for Retorts, &c.," to be sent to the undersigned on or before Twelve o'clock noon, on Thursday, Feb. 19, 1903.

By order,
PEREGRINE THOMAS,
Town Clerk.

Town Hall, Leigh, Lancs.,
Feb. 4, 1903.

THE Directors of the Burnham Gas Company are prepared to receive TENDERS for the supply and erection of a SINGLE-LIFT GAS-HOLDER, 60 feet diameter by 18 ft. 8 in. deep, all in accordance with Drawings and Specifications prepared by the Company's Engineer, and which may be seen on application to the undersigned, on or after Tuesday, Feb. 10.

Tenders to be addressed to me and delivered on or before Tuesday, Feb. 17, endorsed "Gasholder."

The Directors do not bind themselves to accept the lowest or any Tender.

By order,
J. COX,
Secretary.

Alexandra Villas, Burnham,
Somerset.

BOROUGH OF SWINDON.

TO GAS-METER MANUFACTURERS AND IRON-FOUNDERS.

THE Corporation of Swindon invite TENDERS for the supply and delivery of

1.—About 100 CAST-IRON (METER) LAMP-COLUMNS.

2.—About 100 2-LIGHT DRY (LAMP) METERS,

in accordance with the Specification and Particulars to be obtained on written application to the Borough Surveyor, Town Hall, Swindon.

Tenders, endorsed "Lamp-Columns" or "Meters," as the case may be, to reach the undersigned on or before Twelve o'clock noon on Tuesday, the 17th of February, 1903.

The lowest or any Tender will not necessarily be accepted.

By order,
ROBT. HILTON,
Town Clerk.

Town Hall, Swindon,
Feb. 6, 1903.

COUNTY BOROUGH OF PLYMOUTH.

THE Lunatic Asylum Committee are prepared to receive TENDERS from competent persons, for the construction of a COVERED RESERVOIR, and other Works connected therewith, at Blackadon Asylum, Wrangaton, Devon, situated about 14 miles from Plymouth.

Drawings and Specifications may be seen, and Bills of Quantities and Form of Tender can be obtained from the undersigned after Thursday, the 12th inst., on deposit of Two Guineas, which will be refunded on receipt of a *bonâ-fide* Tender, with the Bills, &c., fully priced out.

Sealed Tenders are to be delivered at the undermentioned address on or before Twelve o'clock noon, on Monday, the 23rd inst., and endorsed "Tender for Covered Reservoir."

The Corporation do not bind themselves to accept the lowest or any Tender.

FRANK HOWARTH, Assoc.M.Inst.C.E.,
Engineer.

Municipal Buildings,
Plymouth, February, 1903.

STOCKTON-ON-TEES CORPORATION.

THE Gas Committee of the above Corporation are prepared to receive TENDERS for the GAS-MAINS, from 3 to 12 inches in diameter, that may be required by this Department between now and the end of December, 1903.

Particulars, &c., may be had on application.

Tenders, sealed and endorsed "Tender for Gas-Mains," to be sent to the undersigned, not later than noon on the 24th day of February, 1903.

WM. FORD,
Manager.

Corporation Gas-Works,
Thompson Street,
Stockton-on-Tees, Jan. 31, 1903.

BOROUGH OF DARWEN.

THE Corporation are prepared to receive TENDERS for all the surplus TAR produced at their Gas-Works for a period of Twelve Months from the 1st of April next.

Further Particulars, and Forms of Tender may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Tender for Tar," and addressed to the undersigned, must be delivered at or before Noon, on Saturday, the 21st of February, 1903.

No Tender necessarily accepted.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, Feb. 3, 1903.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Chief Offices, No. 639, High Road, Tottenham, on Saturday, the 21st day of February next, at Three o'clock in the afternoon precisely, to receive the Report of the Director and Statement of Accounts for the Half Year ended the 31st of December, 1902, to declare Dividends, and to transact such other Business as the Act of Parliament directs.

The TRANSFER BOOKS for the CONSOLIDATED "A" and "B" STOCKS WILL BE CLOSED from Friday, the 6th, to Monday, the 23rd of February, both days inclusive.

By order of the Board,
JAMES RANDALL,
Secretary.

Chief Offices of the Company:
639, High Road, Tottenham,
Jan. 30, 1903.

BRENTFORD GAS COMPANY.

NOTICE is Hereby Given, that a HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at the Charing Cross Hotel, on Friday, the 20th of February inst., at Half-past Two o'clock precisely, to transact the usual Business, including the declaration of a Dividend for the Half Year ending the 31st day of December last, and to elect Directors and Auditors in the place of those who will at such Meeting go out of Office, in compliance with the Company's Acts of Parliament.

By order,
WILLIAM MANN,
Secretary.

Office, Brentford,
Feb. 2, 1903.

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Albion Tavern, Aldersgate Street, in the City of London, on Friday, the 27th day of February, 1903, at Half-past Twelve o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, and to transact the General Business of the Company.

The TRANSFER BOOKS WILL BE CLOSED from the 14th to the 27th of February, both inclusive.

By order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 30, Gracechurch Street,
London, Jan. 30, 1903.

RIDDINGS DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, No. 30, Gracechurch Street, in the City of London, on Friday, the 27th day of February, 1903, at Three o'clock in the afternoon, to receive the Report of the Directors, and the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, and to transact the General Business of the Company.

And Notice is Hereby Further Given, that immediately after the transaction of the business of the above meeting, an EXTRAORDINARY MEETING of the Shareholders of the above Company will be held for the purpose of authorizing the raising, by the creation and issue of Shares of £10 each (nominal value) of the Company, a sum not exceeding in the whole £10,000, being the balance of the Capital authorized by the Riddings District Gas Act, 1888; and also to authorize the borrowing, on mortgage of the undertaking, the sum of £2500 as authorized by the said Act.

The TRANSFER BOOKS WILL BE CLOSED from the 14th to the 27th inst., both days inclusive.

By Order of the Board,
ERNEST W. DREW,
Secretary.

Offices: 30, Gracechurch Street,
London, Feb. 6, 1903.

NORTH MIDDLESEX GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors will be held at the Company's Office, No. 5, Great Winchester Street, Old Broad Street, London, E.C., on Wednesday, the 25th day of February inst., at Twelve o'clock Noon, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 31st of December, 1902, to declare Dividends, to elect Directors, to appoint an Auditor, and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 12th to the 25th day of February inst., both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

Secretary's Office: 5, Great Winchester Street, Old Broad Street, London, E.C., Feb. 5, 1903.

MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.

(INCORPORATED BY ACT OF PARLIAMENT, 1867.)

NOTICE is Hereby Given, that the SEVENTY-SECOND ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-Room, at the Works, Mitcham, in the County of Surrey, on Tuesday, the 24th day of February, 1903, at Three o'clock in the Afternoon precisely, to receive the Report of the Directors and a Statement of the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in place of those retiring by rotation, and for General Business.

The TRANSFER BOOKS WILL BE CLOSED from the 9th inst. until after the Meeting.

NOTICE IS HEREBY FURTHER GIVEN, that, at the close of the above Ordinary Half-Yearly Meeting, an EXTRAORDINARY GENERAL MEETING of the Shareholders will be held to sanction the creation and issue of the FOUR THOUSAND NEW ORDINARY SEVEN PER CENT. Shares of the Additional Capital of the Company remaining to be issued in accordance with the Provisions of Section 21 of the Company's Special Act, and to authorize the Directors to make such calls on the Shares as they may from time to time deem necessary.

By order,
BENJAMIN GREEN,
Secretary and Manager.

Offices and Works: Western Road, Mitcham, February, 1903.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

IMPORTANT SALE OF WATER STOCK.

TO BE SOLD by Auction, in the Long Room of the Queen's Hotel, Fawcett Street, Sunderland, on Thursday, the 19th of February, 1903, at Two o'clock in the Afternoon precisely,

Mr. ATKINSON GIBSON, AUCTIONEER,

NEW STOCK (Maximum Dividend Five per Cent.), authorized to be created and issued under the powers contained in the Sunderland and South Shields Water Act, 1891, of an amount to raise

£24,400

The above Stock will be entitled to Dividend from the 1st day of January, 1903, and be registered in the name of the Purchaser free of charge.

A Deposit of 10 per cent. will be required at the time of Sale; the remainder to be paid on or before the 28th day of February, 1903.

TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY.

MINIMUM PRICE £103 PER CENT.

SALE BY TENDER OF £7500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

IN pursuance of the Tottenham and Edmonton Gas Act, 1898, Notice is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER £7500 of the above DEBENTURE STOCK to be paid up in full on or before the 14th of March next, such Stock being a portion of Additional Capital authorized to be raised by Resolution passed at an Extraordinary General Meeting of the Proprietors held on the 24th day of February, 1900, under the Powers of the above-mentioned Act.

Particulars and Conditions and Form of Tender, may be obtained on application at this Office; and sealed Tenders must be sent in not later than Four o'clock in the afternoon of Saturday, the 28th of February, 1903.

By order of the Directors,
JAMES RANDALL,
Secretary.

Chief Offices of the Company:
639, High Road, Tottenham,
Jan. 30, 1903.

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ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
ILFORD GAS COMPANY.

NEW ISSUE OF £6000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 17, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
HARROW AND STANMORE GAS COMPANY.

NEW ISSUE OF 300 £10 "C" SHARES.

MR. ALFRED RICHARDS will sell the ABOVE BY AUCTION at the Mart, E.C., on Tuesday, Feb. 17, at Two o'clock precisely, in lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £5000 ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 17, at Two o'clock precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

The Executors of Mrs. R. M. Cowland, and Others.
THE GAS-METER COMPANY, LIMITED,
22 £10 ORDINARY SHARES.
THE GOSPORT WATER-WORKS COMPANY,
£470 ORIGINAL STOCK, and £510 NEW ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 17, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
WEST HAM GAS COMPANY.

NEW ISSUE OF £19,100 OF FOUR PER CENT. PERPETUAL DEBENTURE STOCK,

Offering to Trustees and others an investment of the soundest character.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Wednesday, Feb. 18, at Two o'clock, in Lots.

Particulars of the SECRETARY OF THE COMPANY, at the Offices, Union Street, STRATFORD; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

LOWESTOFT WATER AND GAS COMPANY.

SALE BY AUCTION OF 400 ADDITIONAL ORDINARY £10 SHARES,

Ranking for 7 per cent., the Dividend on similar Shares in the Company having been 5¼ per cent. for several Years past; Also

£1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will SELL the above by AUCTION, at the MART, LONDON, E.C., on TUESDAY, Feb. 24, at Two o'clock, in Lots, by order of the Directors.

The Company, Incorporated in 1853, supply Water and Gas in Lowestoft and the surrounding district. The Water-Rental in 1891 was £7146; in 1901, it exceeded £13,500; and the Gas Consumption has advanced from 43 million cubic feet in 1891 to upwards of 70 millions in 1901. New Works to keep pace with the increasing demand for Water and Gas are necessary; and it is for these Works that the new Capital is being raised.

Particulars of Sale, and Form of Instructions for the Auctioneer or Secretary to purchase for Investors unable to attend the Auction, obtainable, post free, of the SECRETARY OF THE COMPANY, 137, London Road, LOWESTOFT, and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By Order of the Directors of the
SOUTH-WEST SUBURBAN WATER COMPANY.

NEW ISSUE OF £6250 FOUR PER CENT. IRREDEEMABLE DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 24, at Two o'clock, in Lots.

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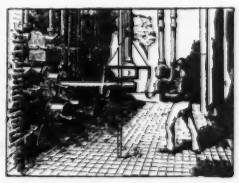

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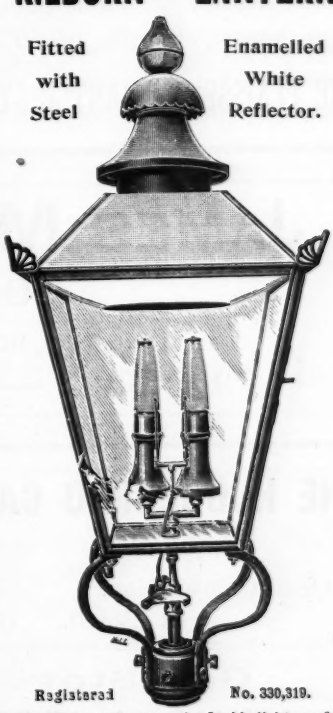

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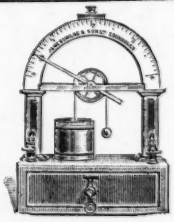

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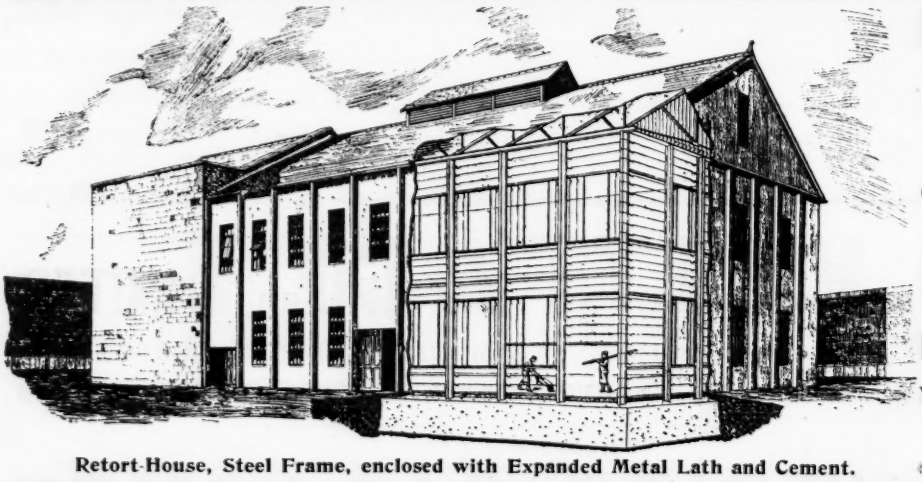

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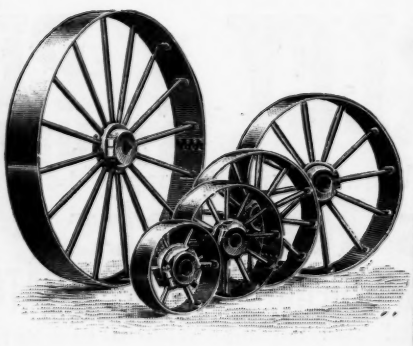

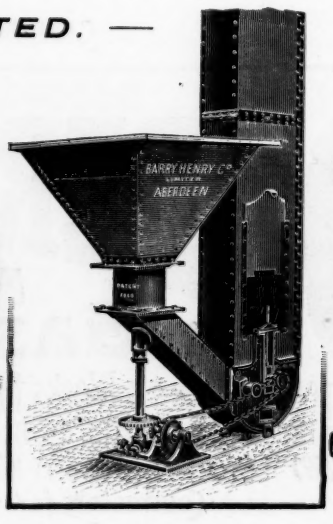

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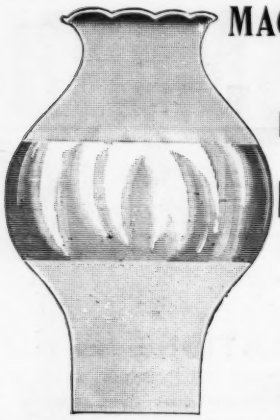

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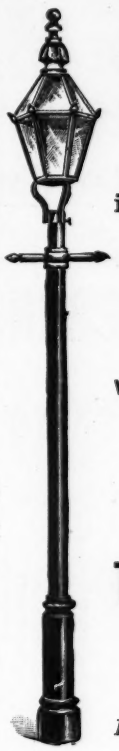

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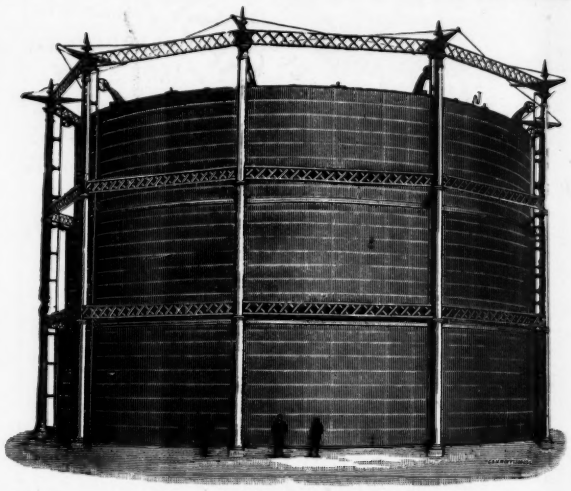

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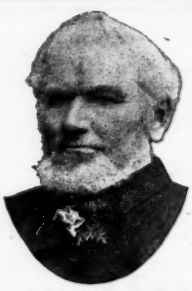

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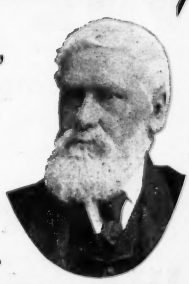

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